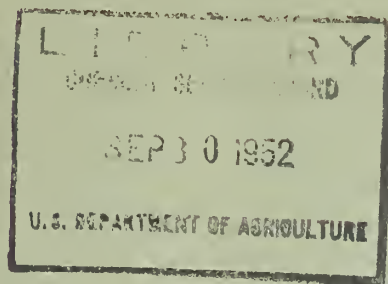


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CHEMISTRY AND TECHNOLOGY OF TUNG PRODUCTS

UNITED STATES DEPARTMENT OF AGRICULTURE

AGRICULTURAL RESEARCH ADMINISTRATION

AIC-317

BUREAU OF AGRICULTURAL AND INDUSTRIAL CHEMISTRY

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ABSTRACT BIBLIOGRAPHY OF THE CHEMISTRY AND TECHNOLOGY
OF TUNG PRODUCTS, 1875 - 1950

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VOLUME III

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C O N T E N T S

VOL. III

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Allgemeine Elektrizitäts-Gesellschaft

PROCESS FOR THE PRODUCTION OF VARNISH

Ger. 509,538 (May 26, 1927); C.A. 25, 834 (1931)

"Addn. to 410,600. In making the lac described in 410,600, from resin, asphalt, wood oil, linseed oil, etc., 1-10 parts of NH_3 are used as the emulsifying agent in the cold." From C.A.

Alvarado, A.M. (to DuPont de Nemours, E. I., and Co.)

MIXED SYNTHETIC GLYCERIDE VARNISHES

U.S. 2,110,072 (Mar. 1, 1938); C. A. 32, 3645 (1938)

"A coating compn. suitable for use on automobile top material comprises asphalt and a mixed polyhydric alc. ester containing the acid radicals of monocarboxylic acids only including acids of Chinawood oil and those from linseed oil, glycerol, etc." From C.A.

Arvin, J.A. (to DuPont de Nemours, E. I., and Co.)

PRODUCT AND PROCESS OF PREPARING SAME.

U.S. 2,029,851 (Feb. 4, 1936); C.A. 30, 2028 (1936)

"A compn. suitable for coating various surfaces comprises a varnish solvent such as "mineral spirits" and the pentaerythritol ester of an unsatd. aliphatic monocarboxylic acid having at least 16 C atoms and an I no. of at least 120, such as the pentaerythritol esters of the acids of linseed, Chinawood or soybean oils, with pigments, driers, etc." From C.A.

Asahi Glass Co., Ltd.

IMPROVED PROCESS FOR THE PRODUCTION OF INSULATING VARNISH COMPOSED CHIEFLY OF RESIN AND CHINAWOOD OIL.

Fr. 638,197 (Feb. 14, 1928); C.A. 23, 293 (1929)

"An elec. insulating varnish is made by heating glycerol and a S or Se compd. with a mixt. of resin and oil of Chinawood in the presence of a catalyst such as Al." From C.A.

Auer, László

COATING MATERIAL EMULSIONS.

U.S. 2,530,370 (Nov 21, 1950)

Protective coatings, such as paints, varnishes, enamels, etc. are obtained by dispersing bodied polyhydric alcohol esters of poly-unsaturated acids of fatty oils in aqueous solutions to form "air-sensitive emulsions" which solidify on brief exposure in thin films to air. Tung oil is first in a list of 18 suitable fatty oils.

Bakelite Corp.

IMPROVEMENTS IN OR RELATING TO RESINOUS COMPOSITIONS AND VARNISHES MADE THEREFROM.

Brit. 324,025 (Jan. 9, 1930); C.A. 24, 3387 (1930)

"Reaction is effected between a phenol such as PhOH or cresol and a fatty oil (such as tung oil, linseed oil or rape oil) in the presence of a non-phenolic acid resin (other than a resin of the polybasic acid-polyhydric alc. type), suitably a natural resin such as rosin, manila, or elemi, with or without the addn. of alk., neutral or acid condensing agents. Various details of procedure are described." From C.A.

The name of V.H. Turkington is given in C.A. as inventor but it does not appear in the patent specification.

Bakelite Corp. (Turkington, V.H.)

COATING COMPOSITION

Can. 308,848. (Feb. 24, 1931) C.A. 25, 2012 (1931)

"Resinous compns. are prepd. by reaction of 100 parts cresol, 200 parts of tung oil and 25 parts of $(CH_2)_6N_4$ at a temp. of 190-200°." From C.A.

Bakelite Corp. (Turkington, V.H.)

VARNISH COMPOSITION.

Can. 313,445, (July 21, 1931)*; C.A. 25, 4724 (1931).*

"A mixt. of about equal parts by wt. of rosin and a reactive resin of the known phenol-methylene type is heated to about 200° for 30-60 min. A clear resin is obtained, sol. in turpentine, tung oil and other oils and yielding a varnish which air-dries in 8-10 hrs. to a hard lustrous film. An essentially similar varnish is prepd. by mixing cresol 100, 40% CH_2O 100, rosin 100, $(CH_2)_6N_4$ 1.5 and tung oil 200 parts by wt. and boiling for 2 hrs. under a reflux condenser, then removing the condenser and continuing to heat until the water is driven off, and finally heating for 1 hr. to 250°. Mn or Pb tungstate (10-12 parts) may be added as a drier." From C.A.

Bakelite Corp. (Turkington, V.H., and Butler, Wm. H.)

DRYING-OIL COMPOSITION.

Can. 322,044 (May 3, 1932)*; C.A. 26, 3685 (1932)

"A drying-oil compn. is prepd. by heating p-HOC₆H₄Ph in tung oil at 200°, dissolving the mixt. in linseed oil and heating to the desired viscosity." From C.A.

Bernstein, G.

PROCESS FOR OBTAINING PROTECTIVE COATINGS FOR APPARATUS.

Fr. 809,425 (Dec. 12, 1936); C.A. 31, 8965 (1937)

"A compn. for coating app. used in contact with war gas, corrosive liquids, flame or smoke, is composed of chlorinated

rubber and crude or boiled oils, preferably of high I index (linseed oil, China wood oil, etc.). The mixt. is dispersed in a solvent such as toluene, and pigments, fillers and plasticizers are added. The coated object is heated to about 120°." From C.A.

Blakeman, W.N.

PAINT COMPOUND OR MIXTURE

U.S. 767,683 (Aug. 16, 1904)

This patent covers the combination of the drying oils described in U.S. Patent 767,682 with pigments. Blends of tung oil (10-25%) with cotton-oil, castor oil, sunflower oil, corn oil, etc. may be ground with white lead, lead sulfate, lead sulfite, zinc oxide, zinc oxychloride, zinc sulfide, zinc oxysulfide, zinc sulfo-chloride, barium sulfate or any combination of these to make paints. An example is given comprising tung oil (15) cotton-oil (85) and zinc oxide (100)

Blakeman, W.N.

OIL AND COMPOUND THEREOF.

U.S. 989,225 (Apr. 11, 1911); C.A. 5, 2190 (1911)

"Oil for use in paints, consisting of a mixt. of tung oil and a chlorinated non-drying fatty oil, as chlorinated cotton oil." From C.A.

Blakemann, W.N.

OIL AND COMPOUND THEREOF.

U.S. 989,227 (Apr. 11, 1911); C.A. 5, 2190 (1911)

"Composition for use as bonding material in linoleum, etc., consisting of tung oil and naphthalene chloride. Ethylenepersulfide, anthracene chloride, methylene perchloride, 'paraffin chloride,' 'tailing wax chloride,' etc., may be used in various mixtures with tung oil, menhaden oil, linseed oil, cotton or sunflower oil or chlorinated fatty oils." From C.A.

Blakeman, W.N.

IMPROVEMENT IN OILS AND COMPOUNDS THEREOF.

Fr. 428,500 (June 22, 1911)

This French specification is substantially the same as British Patent 9,023 (1911) and is entirely embodied in U.S. Patent 989,227. It covers the use of a compound of a fatty oil (e.g. wood oil) with a chlorinated hydrocarbon (e.g. chlorinated naphthalene) alone or with pigments for the manufacture of paints.

Blakeman, W.N.

PAINT COMPOSITION.

U.S. 1,375,352 (Apr. 19, 1921); C.A. 15, 2732 (1921)

"A vehicle for manuf. of paints is formed of tung oil, hydrogenated linseed oil, linseed oil and marine animal oil." From C.A.

Blakeman W.N.

MINERAL OIL

U.S. 1,385,035 (July 19, 1921); C.A. 15, 3757 (1921)

A mixt. of tung oil with Texas oil or a similar mineral oil is used as a paint vehicle. From C.A.

Blakeman, W.N.

PAINT VEHICLE FOR ANHYDROUS PIGMENTS

U.S. 1,385,033, (July 19, 1921); C.A. 15, 3757 (1921)

"A paint vehicle adapted for use with anhydrous pigments is formed of linseed, soy, cottonseed and tung oil or a similar fatty oil mixed with a mineral oil of the Texas oil type; e.g., a hydrogenated asphaltic oil." From C.A.

Blakeman, W.N.

MINERAL OIL

U.S. 1, 385,036, (July 19, 1921); C.A. 15, 3757 (1921)

"Oxidized Texas oil or similar oxidized mineral oil is used in prepg. a paint vehicle, together with tung oil or other similar fatty oil." From C.A..

Blakeman, W.N.

PAINT COMPOSITION.

U.S. 1,430,881 (Oct. 3, 1922),* C.A. 16, 4073 (1922)

"A paint which readily spreads and forms a durable film is formed of tung oil 15, a non-drying fatty oil such as cottonseed oil 60-75, a hydrogenated and oxidized mineral oil of the Pa. type 10-25 and a pigment, e.g., zinc-lead 10 parts." From C.A.

Blakeman, W.N.

MINERAL OIL

U.S. 1,430,882 (Oct. 3, 1922)

An oil vehicle for paints is comprised of tung oil, a non-drying oil and a hydrogenated and oxidized mineral oil of the Pa. type.

Boehmer, Norris (to Chadeloid Chemical Co.)

CHLORINATED-RUBBER VARNISH.

U.S. 1,635,812 (July 12, 1927); C.A. 21, 2992 (1927)

"A clear stable soln. comprises chlorinated rubber and boiled tung or a similar boiled drying oil which has been boiled to about the max. degree compatible with its miscibility with the chlorinated rubber used." From C.A.

Bruson, H.A. (to Resinous Products and Chemical Co.)

COATING COMPOSITION CONTAINING A SICCATIVE.

U.S. 1,920,160 (July 25, 1933); C.A. 27, 4942 (1933)

"For accelerating the rate of drying of autoxidizable coating compns, such as those comprising ester gum and tung oil or the like, there is added a metal salt such as Mn, Co or Pb capryloxyacetates or the like together with a hydroaromatic material such as xylene and other solvents." From C.A.

Buc, H.E. (to Standard Oil Development Co.)

VARNISH

U.S. 1,735,493 (Nov. 12, 1929); Paint and Varnish Production Mgr. 25 (Feb., 1930)

"A varnish comprises 50-90% of a drying oil such as linseed or Chinawood oil, 5-25% or resins such as ester gum, cumar or

fossil resins and 5-25% of the Ca salt of an oil sulfonic acid derived from the treatment of petroleum oil with fuming H_2SO_4 or SO_3 . Sufficient thinner such as turpentine or mineral spirits is added to the above mixt. to reduce it to the desired consistency." From Paint and Varnish Production Mgr.

Canadian General Electric Co. (Adams, L.V.)

METALLIC PAINT.

Can. 313,728 (July 28, 1931); C.A. 25, 5304 (1931)

"A paint comprises a suspension of finely divided Al in a soln. of high-flash naphtha and toluene or a compd. of polyhydric alcohol, phthalic anhydride, acid derived from linseed oil, resin and China wood oil." From C.A.

Canadian Industries, Ltd. (Gauerke, C.G.)

OILBORESINOUS VARNISHES.

Can. 351,670 (July 16, 1935)*; C.A. 29, 6780 (1935)

"China wood oil is heated to 225-58° with glycerol in the presence of a catalyst, such as litharge or other basic oxide (about 0.05% of litharge on the basis of oil used). The mono- and di-glycerides formed are heated at 200-75° with an acidic resin, such as rosin or Congo, to give a mixed acid glyceride combining the acids derived from the China wood oil and from the resin. The product is mixed with any varnish solvent to give the desired viscosity. Driers, such as litharge or manganese resinate, may be incorporated during the esterification of the resin acids, or solns. of driers, such as lead resinate, cobalt linoleate, or manganese resinate in mineral spirits, may be added after the varnish is thinned." From C.A.

Chemische Fabrik Halle-Ammendorf Gebr. Hartmann.

PROCESS FOR MAKING BRILLIANT PRINTS IN SEVERAL COLORS

Fr. 781,912 (Mar. 4, 1935); C.A. 29, 7102 (1935)

The desired image is printed on a support in black or other covering color, as usual, then on this image is superimposed a brilliant varnish, colored or transparent. The varnish is either colored by dyes sol. in the oil or mixed with transparent pigments. The varnish may contain wood oil, see Fr. 781,913

Chemische Fabrik Halle-Ammendorf Gebr. Hartmann

BRIGHT PRINTING VARNISH

Fr. 781,913 (Mar. 4, 1935); C.A. 29, 7102 (1935)

A varnish for covering printed images "contains besides the usual elements such as linseed oil, wood oil, natural or artificial resins, driers, etc., an amt. of org. salts, swelling in the oil, of metals of the group, Mg., alk. earth or earth metals, e.g. linseed oil 200, hard resin 100, Al stearate 15 and Co linoleate 5 gr. or wood oil 180, hard resin 90, Al palmitate 15 and Pb salicylate 0.5 gr." From C.A.

"Cirine-Werke" Josef Lorenz and Co.

PROCESS FOR THE MANUFACTURE OF A WATER-AND ACID-RESISTANT PAINT.

Swiss 142,167 (Sept. 15, 1930); C.A. 25, 2311 (1931)

"A weather-and acid-proof varnish was made by pulverizing a composition made from several varieties of wax, cold-emulsifying with a dry vegetable oil and mixing with a soln. of Co linoleate in dry vegetable oil and a wax solvent. Thus bees-, carnauba, mineral and shellac wax are ground up and emulsified with linseed oil. A paste of Co linoleate and linseed or wood oil and C_6H_6 is then added." From C.A.

"Cirine-Werke" Josef Lorenz and Company

VARNISH

Austrian 121,984 (Nov. 15, 1930);* C.A. 25, 3184 (1931)

"Varnishes comprising wax, fatty oils, a Co siccativ and benzine or turpentine are prepd. by emulsifying a part of the wax, after preliminary comminution, with the fatty oil in the cold, and adding to the emulsion a cooled soln. of the siccativ in the fatty oil and a soln. of the rest of the wax in benzine or turpentine. The wax may be paraffin, ceresin or beeswax, and the fatty oil may be wood oil, linseed oil or thickened linseed oil (stand oil). An example is given." From C.A.

Clayton, William, and Dean, H.K. (to Crosse and Blackwell, Ltd.)

PROCESS OF LACQUERING METAL ARTICLES.

U.S. 2,215,145 (Sept. 17, 1940); C.A. 35, 695 (1941)

"Relates to the electro-deposition of a drying-oil coating from an aq. dispersion of a drying oil such as oxidized linseed or tung oil and a natural or synthetic resin with the ratio of oil to resin greater than 3:1, the coating being dried and stoved to give it hardness and resistance to foods at pasteurization or sterilization temps." From C.A.

Cohn, Arthur.

IMPROVED PROCESS FOR THE MANUFACTURE OF LACQUERS AND VARNISHES.

Brit. 8194 (1912) (Apr. 4, 1913); C.A. 7, 3241 (1913)

Varnishes and lacquers which consist of Chinese wood oil together with terpenes, terpene derivs. such as terpineol, or essential oils containing terpenes, having a minimum b.p. of 170° or with turpentine oil, pine oil, etc., which have been oxidized, as by exposure to air. Driers, fatty oils, resins, etc. may be added.

Cohn, Arthur.

PROCESS FOR THE MANUFACTURE OF LACQUER AND VARNISHES.

U.S. 1,080,100 (Dec. 2, 1913); Paint Manuf. Assoc. of U.S. Cir. No. 249, 79 (Oct. 1925)

A process is described for manufacturing lacquers and varnishes from wood oil, which consists in mixing the wood oil with a terpenylic substance having a minimum boiling point of about $170^\circ C$.

Cohn S.H. (firm)

PROCESS FOR THE MANUFACTURE OF HARD, ELASTIC AND GLOSS DRYING VARNISHES FROM WOOD OIL WITHOUT THE ADDITIONAL USE OF OTHER FATTY OILS AND RESINS.

Ger. 257,601 (Feb. 7, 1912); C.A. Z, 2695 (1913)

Manuf. of hard elastic and lustrous drying varnishes from wood oil without other fatty oils and resins.

Cohn, S.H. (firm)

PROCESS FOR THE PREPARATION OF LACQUERS AND VARNISH

Fr. 441,703 (June 1, 1912); C.A. Z, 554 (1913).

Tung oil normally dries to a flat or wrinkled finish unless combined with resins or other oils. By the addition to tung oil of volatile oils of vegetable origin, or terpenes, having a boiling point about 170°C., it is possible to prepare from tung oil alone coatings that will be firm, lustrous, elastic and rapid drying.

Cohn, S.H. (firm)

PROCESS FOR THE PREPARATION OF LACQUERS AND VARNISHES

Fr. 18,159 (Dec. 4, 1913) (Addn. to Fr. 441,703)

Varnishes of superior quality can be made from wood oil not only with the aid of terpenes boiling above 170°C. (Fr. Pat. 441,703) but also by using terpenes of any boiling point provided they are made rancid by exposure to light and air or by any similar method.

Cohn, S.H. (firm)

VARNISHES FROM WOOD OIL

Dutch 109 (Jan. 15, 1914); C.A. 8, 2497 (1914)

"In a process of preparing varnishes from wood oil, this oil is mixed with turpentine b. not lower than 170°." From C.A.

Cooper, D.R., Murley, E.M., and Wyborn, J.V.

AN IMPROVED PAINT

Brit. 14,137 (1912) (June 12, 1913); C.A. Z, 4087 (1913)

"Composition for making paint consist of crude petroleum, a filling material such as papa rock (a mud-stone, marl or marine clay), burnt clay or whiting, a drying-oil such as linseed, soy, or tung oil, a pigment such as white Pb, Zn white, red oxide of Fe hematite, or red lead, together with driers and turpentine. The filling material is chosen so as to have about the same color as the pigment. NaCl may be added and is caused to mix with the paint by adding it to lime-water and stirring linseed or other oil into the mixt. Petroleum may be enriched with paraffin wax or other ingredients of crude petroleum." From C.A.

Cox, C.H.

STEEL PRESERVATIVE PAINT.

U.S. 1,811,040 (June 23, 1931); C.A. 5048 (1931)

"A mixt. of Zn chromate 12.5 basic Pb chromate 12.5, sublimed blue lead 25 and Mg silicate 50%, 40-60%, is mixed with 60-40% of another mixt. formed from linseed oil 60, China wood oil 20, turpentine 10, an oil drier 5 and a thinner such as "mineral thinner" 5% " From C.A.

Crosse and Blackwell, Ltd., Clayton, William, and Dean, H.K.

IMPROVED PROCESS OF LACQUERING METAL ARTICLES.

Brit. 496, 945 (Dec. 5, 1938); C.A. 33, 4066 (1939)

"The internal surface of a metal foodstuff container or sheet metal used in the manuf. thereof is coated by electrodeposition from an aq. dispersion of a drying oil contg. a drier, the coating being then dried and baked. The dispersion may contain a natural or synthetic resin but in amt. less than that necessary to produce a hard H₂O - resistant coating when applied mechanically; it may contain a small proportion of bitumen, but not a substantial quantity such as is present, e.g., in Japan. The drying oil is preferably 1 whose mols. have a high ratio of cross linkages to chain length, e.g., oiticica or tung oil, or heavily blown stand oils or polymerized heavily blown oils prepd. from linseed or fish oil. Alkyl phenols, chlorinated naphthalenes and Al stearate may be added to the dispersions. NH₄ oleate may be added as emulsifier. Thinners, e.g., turpentine, spirit, may be added to facilitate emulsification. The lacquer may be emulsified in 1% NH₄OH or 1% Na aluminate soln.; in the latter case alumina is deposited simultaneously with the lacquer." From C.A.

Davey, W.P. (to General Electric Co.)

COATING COMPOSITIONs

U.S. 1,726,473 (Aug. 27, 1929); C.A. 23, 5051 (1929)

"A japan comprises water as a dispersion medium with a disperse phase including bituminous material, a drying oil and rubber having in the aggregate a d. less than that of water and a finely divided solid such as clay or lampblack having a d. greater than that of water. So that the disperse phase as an entirety has a d. approx. the same as water" From C.A..

For the drying oils to be used, there are recommended linseed oil and/or chinawood oil. In one example equal parts of oxidized linseed oil and of oxidized china-wood oil are used.

Dayton Synthetic Chemicals, Inc.

IMPROVEMENTS IN PROTECTIVE COATINGS AND IN COMPOSITIONS TO BE USED IN PROTECTIVE COATINGS

Fr. 720,444; (Dec. 3, 1931); C.A. 26, 3941 (1932)

"A phenol such as beta-naphthol in soln. in an org. solvent is incorporated with coating compns. contg. metallic siccatives and China wood oil to prevent crystn. of the latter during drying while not retarding the drying." From C.A.

Dayton Synthetic Chemicals, Inc. (Thomas, C.A.)

COATING MATERIAL

Can. 340,937 (Apr. 17, 1934); C.A. 28, 4256 (1934)

"By use of adrier compn. including β -naphthol incorporated in a metallic drier, tung oil may be used in the production of coating materials with any type of resin, and the film

from such coating material does not crystallize. By use of β -naphthol prolonged heating of tung oil is rendered unnecessary, and the tung oil may be subjected to the heat required for simple bodying. When phenol or chlorophenol is combined with β -naphthol and incorporated in a metallic drier and used in the coating materials, such as varnishes, crystn. of the dried film is effectively prevented, and the color of the material or film is naturally lighter than when naphthol alone is used." From C.A.

Dewsbury, G. and Davies, Arnold

IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF PAINTS, VARNISHES, PRINTING INKS AND THE LIKE.

Brit. 441,571. (Jan. 22, 1936); Addn. to 425,049 C.A. 30, 4702-3(1936)

"A vehicle for paints, varnishes, lithographic inks, etc., is made by incorporating in a dispersion of collagen, prepd. as in 425,049 in a vegetable drying oil, e.g., linseed, tung, perilla and not more than 1% of graphite, which is then reduced to colloidal dimensions by milling. Pigments or powd. metals, e.g., Al, bronze, may be added." From C.A.

Dunham, H.V. (to Casein Company of America)

PAINT AND PROCESS OF PREPARING SAME

U.S. 790,821 (May 23, 1905)

A water-paint contains a binding composition comprising a solution of an animal adhesive consisting of animal glue or casein (preferable casein) (20), ammonia (1), water (170) CH_2O (2.5), boric acid (2), and creosote (1). It also contains a mixture of equal parts of petrolatum with a vegetable oil which may be Indian corn oil (preferable), Chinese tung, linseed, cottonseed, or other oil. The paint is formed by mixing the binding composition (100 parts), petrolatum-oil blend (45 parts) and mineral base, e.g. whiting (200 parts). This is said to be an improvement upon the paint described in U.S. patent 771,241 (Hall) in that the incorporation of vaseline improved its water resistance.

DuPont de Nemours E.I., and Co.

IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF PAINTS, ENAMELS AND LACQUERS.

Brit. 405,826 (Feb. 15, 1934); C.A. 28, 4922 (1934)

"Esters of pentaerythritol with unsatd. monobasic acids having at least 16 C atoms and I no. of at least 120, e.g. the acids of linseed, China-wood, soybean, sardine fish, menhaden, perilla, chia seed, oiticia, Japanese wood, sunflower seed, walnut seed or rubber-seed oils or dehydrated ricinoleic, palmitolic or behenolic acids or the acids obtained by the oxidation of paraffins or waxes, are prepd. by heating the components in the presence of a basic (hydr

oxide, e.g., PbO, CaO, ZnO, NaOH, and preferably in the presence of an inert gas, e.g. CO₂, N, water gas. Examples are given. Coating comps. contg. the esters are prepd. and in examples pigmented products are prepd. from the pentaerythritol esters of linseed oil acids, mineral spirits, Pb and Mn resinates and Fe₂O₃ or white lead, ZnO and asbestine, or the ester of soy-bean oil acids, mineral spirits, Pb and Co resinate, lithopone and ZnO. Varnishes may be prepd. from the pentaerythritol ester of linseed oil acids, mineral spirits and Co linoleate, with or without the addition of ester gum." From C.A.

Dykstra H.B. (to DuPont de Nemours, E.I., & Co.)

COATING COMPOSITION CONTAINING POLYMERIZED DIVINYLBENZENE.

U.S. 1,811,078, (June 23, 1931); C.A. 25, 5049 (1931).

"A compn. suitable for use in lacquers or enamels contains polymerized divinylbenzene and a raw drying oil such as linseed oil or China wood oil." From C.A.

Elektrochemische Werke München A.-G.

IMPROVEMENTS IN THE MANUFACTURE OF VARNISHES

Brit. 395,299 (July 13, 1933) C.A. 28,351 (1934)

"A varnish comprises a colloidal aq. soln. of wood oil stand oil, e.g., wood oil stand oil 75, Co resinate 2 and turpentine oil 25 parts may be mechanically dispersed in 100 parts H₂O to which 1 part of an emulsifying agent, e.g., K resinate, has been added." From C.A.

Ellis, Carleton (to Ellis-Chalmers Co.)

VARNISH COMPOSITION

U.S. 900,687 (Oct. 6, 1908); C.A. 2,596 (1909)

"Varnish. Pontianac resin 100, and Chinese wood oil 100 are mixed with a thinner and drier, as turpentine and benzine." From C.A.

Ellis, Carleton (to Ellis-Foster Company.)

STEEL-PRESERVATIVE PAINT.

U.S. 943,670 (Dec. 21, 1909); C.A. 4, 680 (1910).

"Blue sublimed white Pb 50, Zn chromate 10, Zn dust 5, graphite 10, linseed oil 40, Chinese wood oil 10 and a thinner, as Japan drier and turpentine, each 3 parts. ZnO, Pb and Cu chromates, barytes, SiO₂, naphtha, and Cu oleate are included in various similar formulas." From C.A.

Ellis, Carleton (to Ellis-Foster Co.)

WATERPROOFING-COATING COMPOSITION FOR CONCRETE.

U.S. 999,708 (Aug. 1, 1911); C.A. 5, 3143 (1911)

"Composition for waterproofing concrete, consisting of Pontianac rubber resin, which has been heated to 500-600° until it has lost about 20% in wt., thinned with a volatile liquid, e.g. C₆H₆ or benzine, to which 5-10% of Al soap of Chinese wood oil or 2-3% of ceresin wax may be added to give a flatting effect on the concrete." From C.A.

Ellis, Carleton (to Ellis-Foster Co.)

CONCRETE AND STUCCO PAINT OIL.

U.S. 1, 005,818 (Oct. 17, 1911); C.A. 6, 163 (1912)

"Concrete and stucco paint oil comprizing the Al soap of wood oil, Pontianac resin and a hydrocarbon solvent." From C.A.

Ellis, Carleton (Assign. to Ellis Foster Co.)

COMPOSITION FOR PRIMING AND COATING CONCRETE.

U.S. 1,006,737 (Oct. 24, 1911); C.A. 6, 145;

A waterproofing coating for concrete is made from an unsaponifiable resinous body such as Jelutong or Pontianak rubber resin, a thinner and an acid. For the latter tung oil acid (preferably) or another drying oil acid is used. An example is composed of "air blown" Pontianak resin, heated to 400° F. for 3 hours (10 parts), tung acid (10), Al tungate (1), rubber (2), drier (1), ceresin (1), benzol (10), and benzin (12). [The abstract in C.A. 6, 145 (1912) is incorrect where it refers to tungstic acid and Al tungstate].

Ellis, Carleton

PROCESS OF TREATING MASSES OF CONCRETE

U.S. 1,130,717 (Mar. 9, 1915) C.A. 2, 1105 (1915)

"Roughening the surface of concrete and waterproofing it with a wear-resisting material by successive treatments with 5-10% HCl or a soln. formed by NaHSO_4 and MgCl_2 and a mixt. of resins or varnish gums, Chinese wood oil and alundum or carborundum with or without paraffin, ceresin or tetrachloronaphthalene." From C.A.

Ellis, Carleton.

TREATING CONCRETE.

U.S. 1,189,551 (July 4, 1916); C.A. 10, 2136 (1916)

"A cold-cut satd. soln. of Jelutong or Pontianak rubber resin in a hydrocarbon solvent, such as C_6H_6 , 3 parts is mixed with Chinese wood oil 1 and Japan drier 0.12 part." From C.A.

Ellis, Carleton, and Rabinovitz, Louis (O.4 to Ellis-Foster Co. and O.6 to Indestructible Paint Co., Ltd.

PROCESS OF MAKING VARNISH BASES

U.S. 1,226,760 (May 22, 1917); C.A. 11, 2156-7 (1917)

"The pat. relates to reduction of acidity of resins for use in varnishes, which may be accomplished by esterification. * * *Kongo, Pontianak, Kauri and other similar hard resins or gums may be treated in the manner described and the products may be melted and mixed with boiled linseed oil, Chinese wood oil or other varnish oils and with pigments such as white lead or ZnO which would react with the acid present in untreated varnish (and produce "livering") if the latter were used. * * " From C.A.

Fey, George and Co.

PROCESS FOR THE PRODUCTION OF POLISHING VARNISHES APPLICABLE AS BRUSHING, DIPPING AND SPRAYING VARNISHES.

Swiss 134,371 (July 31, 1929); C.A. 24, 1753 (1930)

"A hard quick-drying varnish is prepd. by mixing spirit varnish nitrocellulose lac, a soln. of rosin in spirit and a softening agent. An example gives AcOBu , collodion cotton, shellac, spirits, $\text{OHCH}_2\text{CH}_2\text{OEt}$, castor oil and wood oil."

From C.A.

Gatlin, E.C.

PAINT-OIL COMPOUND

U.S. 1,011,611 (Dec. 12, 1911)

The sole claim applies to "An oil compound comprising rosin, carbonate of calcium, sugar of lead, fish oil, oil of myrbane, coal oil, naphtha, and raw oil--." The example contains China wood oil (750 lb.) with rosin (500 lb.), CaCO_3 (20 lb.), "plumbi subacetate" (25 lb.), fish oil (375 lb.), oil of myrbane (1 oz. per gal. of product), coal oil (200 gals.), naphtha (225 gals.) and raw linseed or soybean oil (2%).

Gardner, H.A.

REACTION PRODUCT OF TUNG OIL AND A DECHLORINATED OIL AND PROCESS OF MAKING SAME.

U.S. 1,463,883 (Aug. 7, 1923) J.Soc. Chem. Ind. 42, 1032-A (1923)

"Dechlorinated oil prepared as described in U.S.P. 1,384,447 (J., 1921, 667A) is mixed with tung oil, whereupon gelatinization of the latter rapidly occurs and a rubbery mass is produced which does not readily crumble. This reaction can be applied to the production of drying films as in the preparation of paints and varnishes. From J. Soc. Chem. Ind.

Gardner H.A.

COATED OR IMPREGNATED BODY AND METHOD OF PREPARING THE SAME.

U.S. 1,463,884 (Aug. 7, 1923);* J. Soc. Chem. Ind. 42, 1032A (1923)

"The fresh mixture of dechlorinated oil and tung oil may be painted on substances so as to form in situ protective films or coatings. Porous substances may be impregnated with it to a greater or less depth. Suitable pigments may be added to produce coloured films. The invention may also be employed in the production of laminated bodies by impregnating sheets of paper, wood, or the like, superposing these while the mixture is still liquid, and then allowing to harden. Addition of substances such as sulphur chloride accelerates the gelatinisation, as does the application of heat." From J. Soc. Chem. Ind.

Ginn, W.W. (to Vigin, Inc.)

VEGETABLE OIL.

U.S. 2,349,546 (May 23, 1944); C.A. 39, 1066 (1945)

"Fish oil, such as sardine oil, is brought to a cooking

temp. over 45-75 min. after which approx. 1/4-1% of castor oil is added. The oil is then cooked at about 575°F for 2 hrs.. The oil is thus sufficiently bodied for use in varnishes, printing inks, coating compns. and the like. Instead of fish oil, oiticica with soybean oil, linseed, perilla oil and the like, may be treated with castor oil in the above manner. Blown castor oil may be used as well as comm. medicinal castor oil (such as Baker's AA)." From C.A.

In the introduction it states that "China wood oil is peculiar in that it bodies very much faster than the other oils and also in that it provides varnish films which generally are superior in toughness, durability and moisture-proofness. It is the aim of this invention to furnish from cheaper oils a product similar in properties to a China-wood oil varnish."

Graves, G.D., and Thomas, R.E. (to DuPont de Nemours E.I. and Co.)

ESTERS OF UNSATURATED ALIPHATIC MONOCARBOXYLIC ACIDS.

U.S. 2,109,943 (Mar. 1, 1938); C.A. 32, 3523 (1938)

"Details are given of the prepn. of esters such as dodecyl linoleate, coconut alc. esters of eleostearic acid, which may be used in conjunction with natural resins such as dammar or with synthetic resins such as polyvinyl chloride or with cellulose derivs. such as cellulose nitrate, ethyl-cellulose or cellulose acetate in the prepn. of lacquers and enamels for coating metal, wood, fabrics, paper and wire screens, dopes for coating fabrics, moisture-proofing lacquers for coating regenerated cellulose, etc., and in plastic compns. used in the manuf. of toiletware, sheeting, rods, tubes, safety-glass interlayers, dentures, etc. They may be used in treating leather." From C.A.

Green, J.B. (to Chicago Steel and Wire Co.)

METHOD OF MAKING CEMENT-COATED WIRE.

U.S. 1, 783, 613 (Dec. 2, 1930); C.A. 25, 424 (1931)

"Coating material such as naphtha soln. of China wood oil and glycerol ester gum is applied to the wire in coil form and the coated wire is dried while suspended on a rotating support upon which it is constantly changing its position." From C.A.

Hall, W.A.

PAINT COMPOSITION

Fr. 337,723 (Feb. 27, 1904)

Similar to U.S. 771,241 and Brit. 26,903 (1903). It concludes with the following (translated from the French): "In summary, this invention relates to a paint composition comprising a mineral base such as talc or Spanish whiting, a vegetable oil, water, and a binding composition comprising an animal adhesive which combines with the oil, water, and base to prevent frothing and to permit the paint to be spread easily."

Hall W.A.

PAINT COMPOSITION.

Brit. 26,903 (1903) (Feb. 11, 1904); J. Soc. Chem. Ind. 23, 328 (1904)

A water-resisting and more or less elastic paint is produced by mixing a mineral base, such as talc (200 parts), a vegetable oil, e.g., tung oil (25 parts), potassium oxalate (2 parts), and water (50 parts), and adding to the mixture 100 parts of a binding composition consisting of casein (20 parts), ammonia (1 part), formaldehyde (2.5 parts), boric acid (2 parts), creosote (1 part), and water (170 parts).

Hall, W.A.

PAINT COMPOSITION.

U.S. 771,241 (Oct. 4, 1904).

Water-base paints can be rendered more waterproof and elastic by the incorporation of a vegetable oil, preferably tung oil. To prevent frothing when pigments are incorporated a glutinous animal adhesive is included. Example: A paint is composed of a neutral base, preferably talc, (200); vegetable oil (25), KC_2O_4 (2), H_2O (50), and binding composition (100) made from glue or casein (20), ammonia (1), H_2O (170), CH_2O (2.5), and (optionally) H_3BO_3 (2 and creosote (1).

Hall, W.A.

PAINT COMPOSITION.

U.S. 797,683 (August 22, 1905)

A practically dry paint composition which is intended to be diluted with water before use can be prepared from whiting or talc, a vegetable oil, an animal adhesive (e.g. glue or casein), formaldehyde and, optionally, potassium oxalate and/or boric acid. The vegetable oil "may be either an oxidizing oil, such as linseed or Chinese tong or tung oil, or a non-oxidizing oil such as cotton-seed oil or Indian-corn oil."

Harth, P.E.

PAINTS OR LIKE COATING MATERIALS AND METHOD OF MANUFACTURING THEM.

Brit. 449,239. (June 11, 1936); C.A., 30, 8664 (1936)

"Paints, etc., are made by incorporating finely comminuted foliated glass, as a base or filler, in a vehicle, e.g., linseed or tung oil, varnishes or lacquers, that will harden." From C.A.

Harvel Corp. (Harvey, M.T.)

IMPROVEMENTS IN OR RELATING TO METHODS OF TREATING CASHEW NUT SHELL LIQUID.

Brit. 300,654 (May 16, 1928)

"Various products such as coating and impregnating materials, insulating materials, moulding compounds,

resin-like materials, etc., are made from cashew nut shell liquid. To produce a drying product the liquid may be heated (1) alone, or (2) in the presence of metals or metal compounds, such as Cu, Pb, Mn, Pb oxide, CuCO_3 , Cu oleate, cuprous ammonium carbonate, etc., or (3) in the presence of air which is blown through it. The liquid may also be treated with aldehydes such as HCHO or furfural. Oils such as linseed, china-wood, japan wood, fish oil, etc., may be incorporated before or after or at any stage of the heating process to vary the product.

Harvey, T. (to Harvel Corp.)

COATING COMPOSITIONS.

U.S. 2,264,373 (Dec. 2, 1941); C.A. 36, 1794 (1942).

"A coating compn. adapted to be applied as a liquid film and to dry when so applied is formed of a drying oil such as China-wood oil and an alkyl ether such as the ethyl ether of a phenol derived from cashew nutshell liquid and contg. the characteristic unsatd. hydrocarbon side chain of cashew nutshell liquid." From C.A.

Hecht, Eduard

PROCESS FOR THE MANUFACTURE OF VARNISHES.

Ger. 124,427 (Dec. 21, 1900).

This process consists in the solution of hard resins, such as Zanzibar and Angola copals, in the fatty acids of Chinese wood oil with or without the addition of wood oil, other drying oils or bodied oils.

Hecht, Eduard and Poulenc, G.

IMPROVEMENTS IN PROCESSES FOR THE MANUFACTURE OF LACQUERS AND VARNISHES.

Brit. 4702 (1901) (Mar. 5, 1902); J. Soc. Chem. Ind. 21, 487 (1902).

"The objection to the use of Japanese and Chinese wood oil (tung oil) in the manufacture of varnishes is that the heat required to dissolve copals renders the tung oil sticky. In the present patent this is obviated by using the fatty acids instead of the oil itself. A suitable proportion of the fatty acids is mixed with a drying oil, and the mixture heated to 250°C ., a clear liquid being thus obtained, which mixes well with linseed and poppy-seed oils, etc., and can be diluted with turpentine.

Copals can also be readily brought into solution by mixing them in a powdered condition with the anhydrous fatty acids (say in the proportion of 25 to 50 per cent.), and heating the mixture to 280°C . The resulting varnish is diluted with turpentine to the required consistency." From J. Soc. Chem. Ind.

Henning, C.I.B., Burke, C.E., and Reid, E.E. (to DuPont de Nemours E.I. and Co.)

VARNISHES.

U.S. 1,742,508 (Jan. 7, 1930); C.A. 24, 1235 (1930).

"China wood oil, linseed oil, rosin and turpentine are used with the Co salt of the butyl half-ester of phthalic acid or with other Co salts or Fe, Zn, Mn, Cu, Sn, Pb, Hg, Ni, Ag, Au or Pt salts of monoalkyl esters of phthalic acid sol. in acetone." From C.A.

Hentschell and Co.

OIL PAINT FROM ZINC WHITE

Fr. 366,427. (May 22, 1906)* C.A. 1, 2432 (1907)

"An oil paint from zinc white, manufactured by adding silica in equal or greater quantity than the zinc white, calcium carbonate, and an oil or fat vehicle composed of a varnish, linseed oil, wood oil, or Japanese balm-wood oil with resin." From C.A.

Herrmann, Paul

PROCESS FOR THE MANUFACTURE OF STABLE OIL PAINTS.

Ger. 117,564 (Apr. 20, 1900)

This patent describes a process of manufacturing stable oil paint pastes which consists in mixing the pigment with a binder consisting of Chinese wood oil and a wax (preferably a vegetable wax). The solid product is superior to linseed oil-wax compositions which tend to separate from the pigment and to dry too slowly and are also superior to paints containing raw Chinese wood oil without wax for the latter dries to a flat, dull finish.

Hooft, F.V. (to Lucidol Corp.)

AUTO-OXIDATION AND POLYMERIZATION CATALYST.

U.S. 2,032,554 (Mar. 3, 1936); C.A. 30, 2781 (1936)

"A compn., the vehicle of which contains a bodied drying oil consisting largely of eleostearin such as bodied China Wood oil, is used with a small proportion (suitably about 1% or less) of dibenzoyl peroxide or the like which serves as an oxidation and polymerization catalyst for the eleostearin." From C.A.

Horn, A.C.

COMPOSITION FOR WATERPROOFING CONCRETE

U.S. 1,048,695 (Dec. 31, 1912); C.A. 7, 693 (1913)

"Composition for waterproofing concrete, containing Chinese wood oil, Ca stearate, casein, a preservative and H₂O." From C.A.

Horn, A.C.

TRANSPARENT WATERPROOFING

U.S. 1,073,129 (Sept. 16, 1913); CA 7, 3653 (1913)

"Water-proofing concrete by superficial impregnation with Al stearate and Al "tungate", the coating being transparent and not altering the natural appearance of the concrete." From C.A.

Hull, S.M. (to Western Electric Co.

ORGANIC MOLDING COMPOSITION.

U.S. 1,711,025 (Apr. 30, 1929); Paint Varnish Production Mgr. 19 (Sept., 1929)

"A plastic composition is prepared by combining a protein in the dry state with furfural and a waterproofing agent and then bringing about a condensation of the protein and furfural. Suitable fillers may be incorporated. Example: A mixture of 50 parts of finely ground casein and 40 parts of slate dust is thoroughly mixed with a solution of 5 parts of rosin-glycerol ester in 5 parts of furfural. The resultant moist plastic mass is then molded at a pressure of 2500 lbs./in.² at 212°F. for 30 min. The resulting product is a satisfactory substitute for bone, horn, ivory, celluloid, etc. The glycerol-rosin ester may be replaced by various gums, waxes, resins, cellulose-esters, bituminous materials, tung oil, etc., and if desired, they may be incorporated by means of acetone or benzene, etc. Likewise, the slate dust may be replaced by magnesia, infusorial earth, wood flour, asbestos fibre or mica dust, etc." From Paint Varnish Production Mgr.

Hunter, C.W.

NEW OR IMPROVED WATER-PROOF AND DAMP-PROOF COATING MATERIAL ESPECIALLY APPLICABLE TO EXPLOSIVES.

Brit. 17,155 (1912) (July 17, 1913); C.A. 8, 424 (1914).

"Adding China wood oil or (so-called) tung oil to collodion waterproof varnish for explosives or other hygroscopic substances." From C.A.

Hyman, Julius (to Velsicol Corp.)

GAS-PROOF VARNISH AND METHOD OF MAKING SAME.

U.S. 2,012,279 (Aug. 27, 1935); C.A. 22, 6780 (1935)

"Tung oil is used with a drier and with a "gas-checking" inhibitor such as monomethylaniline, diphenylguanidine, m-phenylenediamine, β -naphthylamine, β -thionaphthol or a thiocresol." From C.A.

I.G. Farbenindustrie, A.-G. (Bernard, H.)

PROCESS FOR THE PRODUCTION OF EASY-SPREADING, HIGH-GLOSS OIL LACQUERS CONTAINING BASIC PIGMENTS, E.G. ZINC WHITE
Ger. 625,979. (Sept. 11, 1927) C.A. 30, 5822 (1936)

"Lacquers contg. basic pigments such as Zn white are given flowing and glossy properties by addn. of arylhydroxy fatty acids. Thus, linseed oil and wood oil are boiled to form a thick oil. Phenoxy-acetic acid is added at 100-130°. On cooling, finely divided ZnO is added. After standing, the mass is diluted with lacquer benzine and oil of turpentine and a liquid Co siccative added. Other examples are given." From C.A.

I.G. Farbenindustrie, A.-G.

LACQUERS AND OTHER COMPOSITIONS.

Brit. 322,780 (Aug. 8, 1928); C.A. 24, 2903 (1930).

"Lacquers, artificial masses, etc., are prepd. by replacing the simple varnishes described in Brit. 301,133 (C.A. 23, 4089) by "gum varnishes" prepd. by melting natural or artificial resins in drying oils, which may contain other ingredients such as driers, diluents, coloring

substances and a plastifier b. above 150°. Numerous details and examples are given. Cf. C.A. 24, 981" From C.A.

In example No. 4, a nitrocellulose soln. is incorporated with a mixture of blown castor oil and a Benguela Copal-wood oil varnish, Co resinate being added.

I.G. Farbenindustrie, A.-G.

IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF PAINTS, Brit. 335,626 (Oct. 2, 1930); C.A. 25, 1691 (1931)

"There is incorporated with paints or other coating materials at least such a quantity of pptd. ZnO (dried by heating to a temp. not materially exceeding 500°) as is necessary to combine into soaps all free or combined fatty acids present in the binding agent such as linseed oil or China wood oil. Various details and examples are given." From C.A.

I.G. Farbenindustrie A.-G.

PROCESS FOR THE IMPROVEMENT OF THE CAPACITY OF CERTAIN COLORING MATERIALS TO BE MIXED WITH BINDERS.

Fr. 702,045 (Jan. 19, 1931); C.A. 25, 4137 (1931)

"The mixing of coloring substances such as lithopone, Zn white, Fe₂O₃ or "Hansa" red with fixative agents such as linseed oil or wood oil, is facilitated by adding to either or to their mixts. monoacidylalkylenediamines or acidylpolyalkylenepolyamines or their alkylated products or quarternary ammonium bases. Examples are given of the use of monooleyethylenediamine and triethylenetetramine." From C.A.

I.G. Farbenindustrie, A.-G.

IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF PAINTS AND THE LIKE

Brit. 353,319 (July 23, 1931); C.A. 26, 3685 (1932)

"Incorporation of pigments such as Ti white, lithopone, zinc white, Fe red or blanc fixe with linseed or wood oils or the like is facilitated by adding a small proportion of a monoacylalkylenediamine or an acylpolyalkylenepolyamine such as monooleytriethylenetetramine or aklylation products such as the reaction product of monostearyltriethylenetetramine and propylene oxide. Thinners may be added." From C.A.

I.G. Farbenindustris, A.-G.

IMPROVEMENTS IN THE MANUFACTURE AND PRODUCTION OF OIL VARNISHES.

Brit. 419,611 (Nov. 15, 1934); C.A. 29, 2764 (1935)

"Oil varnishes are prepd. by incorporating drying oils with rubber isomers, or their hydrogenation products, which are thermoplastic, resinous and brittle, have about the compn. (C₅H₈)_x, have a softening point between 50° and 130° and are readily sol. in aromatic, aliphatic open chain or cycloaliphatic hydrocarbons and chlorinated hydrocarbons.

Natural or synthetic resins, siccatives and pigments, including powd. metals, may be added. In an example, a resinous rubber isomer obtained according to Brit. 382,775 (C.A. 27, 4441) is boiled for 1 hr. with a mixt. of linseed-oil stand oil and China wood oil. A small amt. of Pb-Co naphthenate is then added and the varnish obtained is dild. with a benzine fraction of b.p. 130-160°." From C.A.

Imperial Chemical Industries, Ltd. (Drummond, A.A., and Morgan, H.H.)
IMPROVEMENTS IN AND RELATING TO SYNTHETIC RESIN VARNISHES.
Brit. 345,633, (Mar. 19, 1931); C.A. 26, 323 (1932)

"Drying of the varnishes is accelerated by adding salts of dehydrating character such as FeCl_3 , ZnCl_2 , SnCl_4 , AlCl_3 or CaCl_2 or KHSO_4 , and fatty acid esters such as castor oil, tung oil or the like. Various details of prepn. are given." From C.A.

Imperial Chemical Industries, Ltd.

IMPROVEMENTS IN AND RELATING TO THE ART OF COATING COMPOSITIONS AND, MORE PARTICULARLY, TO THE PRODUCTION OF NEW SYNTHETIC RESINS AND COATING COMPOSITIONS MADE THEREFROM.
Brit. 349,442 (May 26, 1931); C.A. 26, 2071 (1932)

"Furfurethylene is polymerized (preferably by heating for at least 3 hrs. at 180° or higher) in the presence of a suitable catalyst such as benzoyl peroxide, H_2O_2 , KClO_4 , O_3 , linseed oil acids, blown linseed oil, china wood oil, furylacrylic acid or acetic, caproic or benzoic acids, and the polymerized product is used in coating compns. with other materials such as toluene, BuOAc , tricresyl phosphate, etc., with or without nitrocellulose, solvents for the latter driers, etc." From C.A.

Imperial Chemical Industries, Ltd.

DRYING OILS AND THEIR APPLICATIONS.

Fr. 781,293 (Feb. 18, 1935); C.A. 29, 7101 (1935)

Similar to Brit. 428,864 (May 15, 1935) issued to Imperial Chemical Industries (Hill, A. and Walker, E.E.)

Imperial Chemical Industries Ltd. (Hill, Arthur, and Walker, E.E.)

IMPROVED DRYING OILS AND THEIR APPLICATION

Brit. 428,864 (May 15, 1935); C.A. 29, 7107 (1935)

"Stand oils that dry quickly and form hard, resistant, glossy films are obtained by polymerizing fat acids of drying or semidrying oils, e.g., linseed, tung, perilla, chia, oiticica, soybean, poppy seed, sunflower seed, hemp seed, rubber seed, maize, wheat, menhaden, sardine, or the alkyl esters of such acids, distg. off all or part of the unpolymerized constituents and converting the residue into esters of glycol, glycerol or higher polyhydric alcs., e.g., pentaerythritol, mannitol, quebrachitol, or mixts. thereof. Colophony or other acid resins, or polycarboxylic acids or their anhydrides, may be present during the esterification, whereby resinous mixed esters result. Polymerization is effected with but little oxidation by

by heating or by treatment with silent elec. discharges. The alkyl esters may be polymerized and then saponified to produce the polymerized acids. Eight examples are given." From C.A.

Isenberg, David

PAINT

U.S. 1,757,864, (May 6, 1930); C.A. 24, 3387 (1930).

"A paint which is suitable for ships is formed of ZnO 10, white hydraulic cement 6, carbonated white lead 15, casein glue 5, Fe oxide 10, Ca(OH)₂ 2, sugar of lead 5, rapeseed oil 10, white banana oil 30, China wood oil 15, EtOH 14, water 1, turpentine 4, oil driers 8, oil varnish 7 and animal gall 5 parts." From C.A.

Jacobs, Siegmund

PAINT

U.S. 2,007,802 (July 9, 1935); C.A. 29, 6081 (1935)

"Crude rubber, solvent naphtha, petroleum, turpentine, linseed oil, China wood oil, kauri gum, ester gum, Mn borate, ZnSO₄ and red lead are used together to form a paint suitable for baking on metals, etc., for flat effects." From C.A.

Jamieson, Hugh

PROCESS OF FINISHING WOOD

U.S. 2,043,541. (June 9, 1936) C.A. 30, 5436 (1936)

"A finish is formed of boiled linseed oil together with 33.3% of a compn. formed from kauri resin 2 oz., raw China wood oil 4.5 oz., turpentine 1.5 oz., "Varnolene" 2.5 oz., and cobalt drier 2.4 cc., pure beeswax 17% and wood filler 16.7% mixed and heated together, this finish is applied to wood and the impregnated wood is then rapidly cooled and is then buffed." From C.A.

Jenkins, R.L. (to Swann Research, Inc.)

COATING COMPOSITION

U.S. 1,974,801 (Sept. 25, 1934); C.A. 28, 7563 (1934)

"A chlorinated polyphenyl is used with a drying oil such as linseed or tung oil to form a coating compn. which may also contain various other ingredients." From C.A.

Koenig, W.J. (to Sloane-Blabon Corp.)

FAST-DRYING COATING COMPOSITIONS AND PRINTING INKS.

Can. 377,736. (Nov. 15, 1938)*; C.A. 33, 2354-5. (1939)

"An oil contg. conjugated double bonds, e.g., China wood oil, is blown, mixed with an oil-resin varnish and α -naphthol, β -naphthol, diphenylguanidine or pyrogallol and heated until the desired viscosity is obtained. The product is mixed with pigments." From C.A.

Koenig, W.J. (to Sloane-Blabon Corp.)

COMPOSITION AND DRYING OF THE SAME.

U.S. 2,100,484 (Nov. 30, 1937); C.A. 32, 1124, (1938)

"In the treatment and hardening of materials, such as China-wood oil varnishes, a reactive volatile org. substance such as cyclohexanol is added to the oil under treatment in excess and the resulting mixt. is spread into films and heated slowly to evap. remaining volatile constituents with formation of a gaseous protective blanket over the film and exclusion of oxidizing gases, so as to cause a substantially non-oxidizing hardening of the oil and production of a product which dries without wrinkling." From C.A.

Kronstein, Abraham

PROCESS OF CONVERTING SOLIDIFIED OILS INTO A SOLUBLE OIL

U.S. 737,249 (Aug. 25, 1903)

A soluble oil is obtained by heating to 180° or above, the solid obtained by polymerizing Chinese wood oil or tung oil (the oil of Elaeococca vernicia or Aleurites cordata), or solid polymers like those of allyl cinnamate. If the heating is stopped as soon as the material has liquified, the resultant oil will form extremely fast drying varnishes.

Kronstein, Abraham

PROCESS OF MAKING VARNISH GUM

U.S. 799,065 (Sept. 12, 1905)

Wood oil heated with resins polymerizes to a solid useful as a varnish resin. Example: Wood oil (120) and dammar resin (80) are heated at 200-250°C. for 16-18 hrs. The product is a solid, insoluble in turpentine and benzene, but which melts at 300°C. yielding an oil soluble in those solvents.

Albert, Kurt, G.m.b.H. Chemische Fabriken

PROCESS FOR THE PRODUCTION OF WOOD OIL VARNISH OR WOOD OIL-NATURAL RESIN LACQUERS YIELDING FLAT-DRYING FILMS.

Ger. 689,344 (Oct. 19, 1933); C.A. 25, 3840 (1941)

"Smooth-drying films of wood-oil varnishes and lacquers are obtained by adding small amts. of p-tert-amylphenol, bis-(p-hydroxyphenyl)- β,β -propane, or a mixture of these. These compds. can be applied after the varnish has been put on." From C.A.

Lawson, W.E. (to DuPont de Nemours E.I. and Co.)

COATING COMPOSITION

U.S. 1,938,662 (Dec. 12, 1933); C.A. 28, 1556-7 (1934)

"A coating compn. suitable for use on wood, etc., contains a polymerized vinyl ester such as polymerized vinyl chloride together with Chinawood oil, linseed oil, perilla oil or hempseed oil, etc." From C.A.

Leishman, T.L.

A COMPOUND FOR USE AS A SUBSTITUTE FOR BOILED LINSEED OIL AND THE LIKE IN VARNISHES PAINTS, WATERPROOFING COMPOSITIONS, LINOLEUM AND THE LIKE.

Brit. 1,980 (1911) (June 29, 1911);* C.A. 5, 3348 (1911)

"A substitute for boiled linseed oil, etc., in varnishes, comprizing Tung oil, boiled soy bean oil, and a fish or equiv. non-drying oil, in various proportions." From C.A.

Lender, Rudolf

PROCESS FOR THE MANUFACTURE OF AGGLUTINATES FOR PIGMENT COLORS, PULVERIZED CORK AND ANALOGOUS MATERIALS, AS WELL AS OF LACQUER PRODUCTS FROM WOOD OIL.

Fr. 434,768 (Dec. 6, 1911)*

This specification is equivalent to British Patent No. 21,667 (1911). The one claim is translated as follows:

"The process for the manufacture of binders for pigment colors, ground cork and analogous materials as well as lacquer products; from wood oil, consisting of adding to the wood oil polymerization products of indene or coumarone, separately or in mixtures."

Lender, Rudolf, and Koch, Albert

PAINT AND VARNISH BASE

U.S. 1,019,666 (Mar. 5, 1912); C.A. 6, 1377 (1912) (no abstract)

This patent applies to the "process of manufacturing a paint and varnish base which comprises mixing Chinese wood oil (Tong oil) with a polymerization product of the coumarone and indene group of compounds at a temperature above 100° C." and to the product so obtained.

Lycan, Wm. H., and Eyre, J.L. (to Pittsburgh Plate Glass Co.)

ARTIFICIAL DRYING OIL.

U.S. 2,373,250 (Apr. 10, 1945); C.A. 39, 3168 (1945)

"Free acids derived from drying oils, such as China wood oil, linseed oil, or fish oil, are treated at 140-220° with alkyl primary or secondary amines contg. at least 2 available OH groups, such as 2-amino-2-ethyl-1,3-propanediol. The condensation is best carried out with a stream of inert gas passing through the reaction mixt. Esterification catalysts may be used. The product may be used in combination with or in place of natural drying oils. It has only a slight tendency to form skins during storage. Its films have high-moisture resistance." From C.A.

Lyons, F.H. (to E.L. Bruce Co.)

FLOOR FINISH

Can. 339,024 (Jan. 30, 1934); C.A. 28, 2555 (1934).

"A floor finish comprises as a base, linseed oil 313, tung oil 94, gloss oil 130, naphtha 365 gallons, paraffin wax 724, zinc stearate 50 lb. and 50% by vol. of xylene." From C.A.

Martin, G.D. (to Monsanto Chemical Co.)

COATING COMPOSITION

U.S. 2,225,918 (Dec. 24, 1940); C.A. 35, 2350 (1941)

The formation of a skin on the surface of drying oils, paints and varnishes may take place even in unopened containers if very high proportions of certain pigments, China-wood oil or polymerized linseed oil are present. This can be prevented by di-secondary amyl hydroquinone, amyl pyrogallol, n-amyl catechol, etc.

Martin, G.D. (to Monsanto Chemical Co.)

COATING COMPOSITION

U.S. 2,225,919 (Dec. 24, 1940); C.A. 35, 2350 (1941)

By the incorporation of a halogenated polyhydric phenol into drying oil compositions such as those containing China wood oil or polymerized linseed oil it is possible to retard skin formation. Suggested phenols include: dichlorhydroquinone, monochlorcatechol, chlorinated di-tert.-amyl catechol, etc.

Martin, G.D. (to Monsanto Chemical Co.)

COATING COMPOSITION

U.S. 2,225,920 (Dec. 24, 1940); C.A. 35, 2350 (1941).

Skin formation on the surface of oils, paints and varnishes, such as those containing China wood oil can be inhibited by the incorporation of a positive oxidation catalyst and a controller of oxidation comprising an aralkylated polyhydric phenol. In an example, to 20-gm portions of a 25-gal. China wood, quick-drying enamel containing 2.5% of a mixed lead, manganese and cobalt drier was added 0.020 gms of mono-benzyl-catechol. The latter increased skinning time from less than 1 day to more than 32 days.

Martin, G.D. (to Monsanto Chemical Co.)

PROTECTIVE COATING COMPOSITION.

U.S. 2,228,667 (Jan. 14, 1941); C.A. 35, 3111 (1941)

"A coating compn. resistant to skin formation in the bulk condition contains a vegetable drying oil such as China wood oil together with a pos. oxidation catalyst such as a mixed Pb-Mn-Co drier and a polyhydroxyl substituted naphthalene, such as 1,5-dihydroxynaphthalene, serving as a controller of oxidation." From C.A.

Martin, G.D. (to Monsanto Chemical Co.)

DRYING OIL COMPOSITION

U.S. 2,228,668 (Jan. 14, 1941); C.A. 35, 3111 (1941)

A coating compn. resistant to skin formation in the bulk condition contains a vegetable drying oil such as China wood oil together with a pos. oxidation catalyst such as a mixed Pb-Mn-Co drier and a phosphoric ester of a polyhydric phenol such as amyl o-phenylene phosphate as a controller of oxidation.

Martin, G.D. (to Monsanto Chemical Co.)

COATING COMPOSITION

U.S. 2,268,491 (Dec. 30, 1941); C.A. 36, 2744 (1942)

"A coating compn. contg. a drying oil of the type which rapidly develops a skin in the bulk condition, such as China wood oil, has incorporated with it a pos. oxidation catalyst, such as a Pb-Mn-Co drier, and a controller of oxidation comprising p-hydroxyphenyl phosphorous acid dichloride or other ester of a trivalent P acid in which at least one of the ester-forming groups is an aryl or arylene group." From C.A.

Mayfield, E.E. (to Hercules Powder Co.)

METHOD OF MAKING VARNISHES HAVING HIGH-PARAFFIN HYDRO-CARBON TOLERANCE AND THE PRODUCT THEREOF.

U.S. 2,180,535 (Nov. 21, 1939); C.A. 34, 1868 (1940)

"A method of making a varnish contg. a paraffin hydrocarbon-insol. resin derived from pine wood, involves cooking the resin at a temp. of about 295-315° with China wood or linseed oil or other drying or semidrying oil and with a compd. of Zn, Pb, Sn, Mn and Co, such as PbO, etc." From C.A.

Metallgesellschaft A.-G. (Schober, Oskar, applicant in U.S.)

PAINTS

Fr. 784,448 (Apr. 29, 1935); C.A. 30, 308 (1936)

A paint for metals, etc., contains 25-60% of an Al-Si pigment in a state of such fine division that it passes, at least for the greater part, through a sieve of 10,000 mesh per sq. cm., and about 25-70% of one or more binders such as boiled linseed oil or wood oil. A diluent about 25 and an inert filler about 25% may also be present. The Al-Si preferably contains Al about 30-68%.

Murray, J.D. (to Murray Liquafilm Corp.)

COATINGS.

U.S. 2,099,570 (Nov. 16, 1937); C.A. 32, 375 (1938)

"A method of making a coating material suitable for use on labels and wrappers comprises heating a mixt. of a cellulose deriv. such as cellulose xanthate, cellulose acetate, cellulose nitrate, cellulose phthalate, ethyl-cellulose or benzylcellulose, together with unsatd. oil selected from the group consisting of castor oil, soybean oil, China wood oil, perilla oil, sunflower oil, cottonseed oil, corn oil or linseed oil, blowing air through the mixt. until at least the major part of the cellulose material and the unsatd. oil have combined, and dissolving the blown mixt. in a solvent, such as Bu lactate, carbitol acetate and Bu carbitol." From C.A.

Nachf, G.L.

PROCESS FOR THE PREPARATION OF PRIMERS BASED ON FATTY OILS OR OIL VARNISHES.

Ger. 541,916 (Aug. 4, 1926); C.A. 26, 2608 (1932)

"A foundation of Mg compds. with fatty acids of swelled resin is used. Thus, linseed oil and wood oil are heated to 280° for a short time. The temp. is then reduced to 100° and MgO.H₂O added. The soln. is diluted with C₆H₆ and Pb-Mn added." From C.A.

Novotny, E.E., and Johnson, W.W. (to Stokes, John S.)

UREA-ALDEHYDE PLASTICIZED RESIN AND PROCESS OF MAKING THE SAME.

U.S. 1,951,526 (March 20, 1934); C.A. 28, 3606 (1934)

"China-wood oil (suitably in a proportion of about 5%) is incorporated with a resinous condensation product of furfural and urea, in order to improve its flexibility." From C.A.

Ohta, Hirotaro, and Kaisha, A.G.K.

AN IMPROVED PROCESS FOR PRODUCING INSULATING VARNISH, WHICH PRINCIPALLY CONSISTS OF ROSIN AND TUNG OIL.

Brit. 301,341 (Aug. 17, 1927); C.A. 23, 4089 (1929);

Paint Varnish Production Mgr. p. 18 (Apr. 1929)

"In the manufacturing of insulating varnishes consisting principally of tung oil and rosin, these ingredients are treated with glycerine and a sulfide or selenide in the presence of a catalyst such as Al. In an example, 1,000 parts of rosin, 20-50 parts of Al, 50-150 parts of glycerine, 5-30 parts of anhyd. Na₂S and 1,500 parts of tung oil are mixed and heated to 240-300°. After the reaction is complete, pigments and diluents, e.g. turpentine, may be added. Instead of Na₂S, other alkali or alkali earth sulfides or selenides may be used." From Paint Varnish Production Mgr.

Ohta, Hirotaro (to Asahi Glass Co.)

PROCESS FOR PRODUCING INSULATING VARNISH, WHICH PRINCIPALLY CONSISTS OF ROSIN AND TUNG OIL.

U.S. 1,801,368 (Apr. 21, 1931): C.A. 25, 3502 (1931)

"A mixt. comprising rosin, glycerol and tung oil, in the presence of Al as a catalyst, is treated with an anhyd. sulfide or selenide of an alkali or alk. earth metal such as Na sulfide or selenide." From C.A.

Pal, Nicholas, and Palsales, Ltd.

COATING COMPOSITIONS.

Brit. 473,516 (Oct. 14, 1937)* C.A. 32, 3177 (1938).

"A plastic paint, free from proteins, glycerol and rubber, comprises a silicate soln., SiO₂ and a small amt., e.g., 5%, of a vegetable oil, e.g., tung or soybean oil. Cryolite may be added to give a harder finish and fillers, e.g., clay, china clay, asbestine, bentonite, kieselguhr, chalk, may be present. A natural or synthetic resin may

be incorporated. A surface coated with the paint may be subsequently glazed, e.g., by application of a coating of chlorinated rubber, artificial resin or cellulose nitrate or acetate." From C.A.

Patentverwertungs G. m. b. H "Hermes"

VARNISH RESISTANT TO COLD

Belg. 445,155, (May 31, 1942) C.A. 39, 632 (1945)

"The varnish is composed of resins reactive to oil, wood oil with or without linseed oil." From C.A.

Peterson, N.R., and Sherk, J.L. (to Dow Chemical Co.)

CELLULOSE-ETHER VARNISHES AND METHOD OF MAKING SAME.

U.S. 2,252,521 (Aug. 12, 1941); C.A. 35, 7740 (1941)

"A varnish is prepd. by cooking together a mixt. consisting essentially of 15-80% of an oil of the glyceride type such as tung oil and linseed oil and an oil-sol. resin at a soln. temp. of 400-600°F., adding 1-25% of an organo-sol. cellulose ether such as cellulose ethyl ether and a Pb or Zn compd. sol. in the varnish cook, such as Pb resinate, serving to accelerate the reactions of the other materials and to render them compatible with each other, continuing the cooking at a temp. above 400°F. at which the cellulose ether dissolves in the mixt. until such solution is effected; this produces a varnish which is miscible to form clear solns. with predominantly aliphatic thinners contg. only minor amounts of aromatic compds. U.S. 2,252,522 relates especially to such a process in which use is made of a Zn compd. such as a "Zn rosin." From C.A.

Port, G.M.

IMPROVEMENTS IN OR RELATING TO COMPOSITIONS FOR THE PRESERVATION OF LEATHER, FABRICS, OR OTHER MATERIALS.

Brit. 20,281 (1901) (Aug. 21, 1902); J. Soc. Chem. Ind. 21, 1239 (1902)

A metallic palmitate, and, in particular, zinc-aluminium palmitate, is dissolved in a drying oil (e.g., linseed or Chinese wood oil) and a mineral resin, such as gilsonite. Gum Kauri, may also be added. The zinc-aluminium palmitate is prepared by adding an excess of zinc-alum to the solution of an alkali palmitate.

Pratt, M.F., Apjohn, T.L. and Happel, John (to Socony-Vacuum Oil Co.)

VARNISH. MANUFACTURE

U.S. 2,229,305 (Jan. 21, 1941) C.A. 35, 3111 (1941)

"A continuous process for mfg. a varnish composed of a resin, a quick-drying oil and a thinner involves flowing a homogeneous dispersion of the resin and oil together with a sufficient amt. of thinner to give a turbulent flow that prevents gelation difficulties through a restricted cooking zone at a temp. between about 500° and 700°F.,

but below temps. that would substantially impair the drying properties of the varnish, and under sufficient pressure to maintain the thinner in the liquid state, the homogeneous dispersion of resin and oil possessing gelling tendencies when similarly passed through the cooking zone in the absence of the thinner, and withdrawing from the cooking zone a cooked mixt. of the three ingredients which then remain in the finished varnish." From C.A.

This invention is particularly concerned with the manufacture of varnishes containing China-Wood oil.

Pungs, W., and Eisenmann, K. (to I.G. Farbenindustrie A.-G.)
MANUFACTURE OF COATINGS AND THE LIKE ARTIFICIAL MASSES.
U.S. 1,982,881 (Dec. 4, 1934); C.A. 29, 627 (1935)

"A resinous condensation product of urea or thiourea and CH_2O which is sol. in a butyl alc. is used together with a cellulose ester such as cellulose nitrate and a varnish made with linseed oil or China-Wood oil, and a substantially non-volatile softening agent such as cyclohexanol acetate or isobutyl phthalate." From C.A.

Reynolds, H.C., Jr. (to Standard Oil Development Co.)
ANTISKINNING AND WEATHER-RESISTING AGENT FOR DRYING-OIL COMPOSITIONS.

U.S. 2,287,946 (June 30, 1942) C.A. 37, 274 (1943)

"With a drying oil, such as China-wood oil, there is used a pos. oxidation catalyst, and, as a neg. oxidation catalyst, a hydrocarbon-substituted carbamionitrile such as dibutyl cyanamide in sufficient quantity (suitably about 0.01-0.5%) substantially to prevent oxidation of the compn. in the packaged state without materially retarding the normal drying rate of the compn. when exposed in a thin film to the normal atm." From C.A.

Reynolds, H.C., Jr. and Kellog, H.B. (to Standard Oil Development Co.)
PRESERVING DRYING-OIL COMPOSITIONS FROM PREMATURE OXIDATION.
U.S. 2,228,487 (Jan. 14, 1941); C.A. 35, 3111 (1941).

"Atm. oxidation of materials such as paint and varnish oils is inhibited by the addn. of about 0.01-0.5% of heptaldoxime or other org. compd. contg. the bivalent oximido group." From C.A.

This invention is also intended to control skinning and gelling in oils, paints and varnishes. In an example, n-heptaldoxime (0.2%) was added to a varnish composed of china wood oil, modified phenolic resin and driers (Pb, 0.4%; Mn, .03%; Co, .01%, based on wt. of drying oil). The non-inhibited varnish formed a skin in 4 days; the inhibited varnish did not form one in 220 days.

Rivkin, Joseph (to Neville Co.)
COUMARONE BASE

U.S. 2,094,331 (Sept. 28, 1937); C.A. 31, 8965 (1937)

"A varnish base comprises China wood oil and alc-sol. phenol-interacted coumarone resin of low acid no., the resin being present in a proportion such as to inhibit gas-checking during drying of a varnish film comprising the base." From C.A.

Rogler, A.

IMPROVEMENTS IN BINDING COMPOUNDS FOR PAINTING PURPOSES.
Brit. 337,523, (Nov. 6, 1930); C.A. 25, 2310(1931)

"Paints which dry rapidly are made by heating, drying or semi-drying oils such as linseed, poppyseed or wood oils, with metal oxides such as those of Zn or Ti, to about 100-150° until a pasty product is formed, and mixing the latter with solvents and pigments. Resin may be added." From C.A.

Rohrmann, A.

PROCESS OF PRODUCING DULL DECORATION PAINTS READY FOR PAINTING.

Brit. 330,673 (June 19, 1930) C.A. 24, 6039 (1930)

"A 'matrix' for the prepn. of dull decoration paints comprises 75 parts of waxes such as beeswax, Japan wax, paraffin and ceresin, 125 parts of copal varnish and wood oil in a solvent, 300 parts of linseed oil and wood oil in a solvent, 485 parts turpentine, 10 parts of drier and 5 parts glycerol. The matrix and pigment are preferable heated together while mixing them." From C.A.

Rosenberg, Herman (to Standard Varnish Works)

VARNISH AND PROCESS OF MAKING THE SAME.

U.S. 1,062,419 (May 20, 1913); C.A. 7, 2485 (1913)

"Making varnish composition by heating a varnish base, consisting, e.g. of Manila gum, linseed oil, soy bean oil and CaO, until a dry film of the material deposited on a test surface shows a wax-like or semi-gloss finish, and dissolving the base in a thinning solvent, e.g. turpentine to produce a ragging varnish having a viscosity of 140° Tagliabue under standard conditions." From C.A.

Other oils which may be used include: Chinese Wood or tung oil, perilla oil, corn oil, or fish oil.

Rosenberg, Herman

IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF VARNISHES

Brit. 20401 (Aug. 20, 1914) C.A. 9, 726 (1915)

"A varnish which dries with a dull or wax-like finish, and which on diln. with a thinning agent may be applied by rubbing with a cloth, is formed by heating a varnish base, consisting of a gum or resin and an oil, for a longer time than usual, more than 4 hrs. at about 500° F. The base is formed of a resin such as kauri, copal, dammar, pontianak resin, or colophony, and a drying or semi-drying oil such as linseed, corn, tung, soy bean, or fish oil. A metal salt or oxide, such as a perborate or resinate, oxides of Pb, Mn, Ca, etc., may be added to the base during the heating. The thinning agent may be spirits of turpentine, pine oil, wood turpentine, resin oil, petroleum distillates, benzine, gasoline, benzene, toluene, xylene, coal-tar naphtha, CS₂, CCl₄, CHCl₃, acetone, acetone oils, etc." From C.A.

Rosenthal, Leo, and Kropp, Walter

WOOD OIL LACQUER.

U.S. 1,836,620 (Dec. 15, 1931)* C.A. 26, 1143 (1932)

"A small proportion (suitably about 2-4%) of an aralkylated phenol such as a benzyl naphthol or benzyl phenol is used in wood oil lacquers of non-skinning character." From C.A.

Rosenthal, Leo, and Lenhard, Wolfgang (to I.G. Farbenindustrie A-G).
PRODUCTION OF ESTERS OF SACCHARIDES OF HIGHER UNSATURATED FATTY ACIDS.

U.S. 1,739,863 (Dec. 17, 1929) C.A. 24, 980 (1930)

"Esters suitable for the prepn. of drying oils, varnishes, lakes, artificial threads, films, plastic compns. or the like are obtained by esterification of the poly unsatd acids, e.g., linoleic acid, etc., from any of the wood oils, the train oils (blubber oils), etc., possessing a high I value, with the polysaccharides such as starch, cellulose or its derivs., cane sugar or the like. The poly unsatd. fatty acids need not be pure but may be accompanied by mono unsatd. fatty acids and (or) satd. fatty acids in mixts. such as occur in natural drying oils of high I value. The new products are viscous, sticky and scarcely flowing oils sol. in aromatic and aliphatic hydrocarbons and turpentine, as well as in drying and non-drying oils and they are oxidized in the air, as the result of which they are rendered totally insol. Examples are given of reaction products formed from sucrose and linoleic acid chloride, starch or "sol. starch" and linoleic acid chloride and hydrocellulose and linoleic acid chloride, in pyridine or dimethylaniline." From C.A.

Rothrock H.S. (to DuPont de Nemours E.I., & Co.)

VARNISH

U.S. 2,047,597, (July 14, 1936) C.A. 30, 6222 (1936)

"Abietyl alc. 1 is heated with China wood oil about 2 parts for 20 min. at about 225° and the material is cooled, thinned with a varnish thinner about 3 parts and mixed with a small proportion of Co linoleate drier soln." From C.A.

Rothrock, H.S. (to DuPont de Nemours, E.I. & Co.)

MIXED ESTERS

U.S. 2,381,881 (Aug. 14, 1945); C.A. 39, 5094 (1945)

"Mixed esters of polyhydric alcs. which have improved film-forming qualities contain at least one radical derived from a β -furylacrylic acid. Prepn. are given for glycerol mixed esters derived from linseed oil acids, with β -2-furylacrylic acid (4 methods), α -methyl- β -2-furylacrylic acid and α -cyano- β -2-furylacrylic acid. Glycerol mixed esters from β -(2-furyl)acrylic acid with benzoic acid, soybean oil acids, and China wood oil acids are also described." From C.A.

Rummelsburg, A.L. (to Hercules Powder Co.)

COATING COMPOSITION COMPRISING A DRYING OIL, A RESIN,
AND AN ACYCLIC TERPENE SOLVENT.

U.S. 2,445,637 (July 20, 1948) C.A. 42, 8493, 1948

"A solvent for coating compns. consists of at least 10% acyclic terpene having empirical formula $C_{10}H_{16}$ and having 3 double bonds per mol. Paints, varnish, and enamels were made by using allo^ocimene which showed shorter drying time than when turpentine or mineral spirits was used as the solvent." From C.A.

In example 1, China-wood oil (232 parts), perilla oil (27), and ester gum (82) were heated to 400°F. Litharge (1.6) was added and the temperature raised to 580-590°F. The varnish base was then removed from the fire and held for a 6-in. string. After checking with bodied linseed oil (6) and cooling to 441°F. the solvent was added.

Rust, J.B. (to Montclair Research Corp.)

DRYING-OIL ACID ESTERS

U.S. 2,464,202 (Mar. 15, 1949): C.A. 43, 4029 (1949)

"Esters are prepd. by heating a partial ester of a polyhydric alc. and unsatd. fatty acids with a monoester of a monohydric unsatd. alc. and a polycarboxylic acid at 120-250° until reaction is substantially complete (acid no. less than 35). The partial ester is formed by heating drying oil acids with an excess of polyhydric alc. After linseed oil acids 1960 and glycerol 322 parts are heated to 200° in a 3-neck flask fitted with agitator, thermometer, and air condenser, the reaction is continued for 6 hrs. at 220-30°. Monoallyl maleate 546 parts is added and the reaction temp. kept at 160-80° for 1.5 hrs., and at 200-20° for an addnl. 4 hrs. The product is a light-colored viscous oil with an acid no. of 28 and a gel time of 10 min. A varnish base is made by heating ester gum 25 with oil 75 parts to 260° in 35 min. and thinning with 100 parts of V.M. and P. naphtha to which are added Pb 0.3, Mn 0.03, and Co driers 0.01% (as naphthenates) based on the oil. Films made from this base are dust-free in 1.25 hrs. and tack-free in 5.5 hrs., with a Sward hardness of 53 after 48 hrs. of air drying. The chief advantages of these esters are (a) they can be made to range between oily liquids and hard solids, (b) they are heat convertible with extremely low gel times, and (c) they may be blended with various drying and semi-drying oils, cellulose esters, rosin esters, and synthetic resins." From C.A.

Among the unsaturated fatty acids desirable in the formulation of these esters are acids from the following oils: cottonseed, linseed, china-wood, soyabean, and menhaden fish oil. The esters may also be blended with various drying or semi-drying oils to secure drying oils which approximate raw China wood oil in gel time, color and drying characteristics.

Ryan, V.A. (to Harvell Corp.)

COMPOSITION OF MATTER USING CHINA WOOD OIL AND CASHEW NUT SHELL LIQUID, AND METHOD OF MAKING IT.

U.S. 1,927,220 (Sept. 19, 1933); C.A. 27, 5995 (1933).

"About equal amounts of China wood oil gel and cashew nut shell liquid are heated together." Cf. C.A. 26, 1495 From C.A.

Saiki, Yosio

OIL PAINT

Japan 129,452 (Mar. 29, 1939)* C.A. 35, 2018 (1941)

"Raw or boiled drying or semidrying oils, such as linseed, tung, cottonseed, soybean oil are mixed with inorg. pigment at 90-300°." From C.A.

Scheiber Johannes (to Chemische Fabriken Dr. Joachim Wiernik & Co. A.-G., and Bakelite Ges.)

DRYING OIL AND OIL VARNISH COATING COMPOSITIONS.

Brit. 299,024 (Oct. 19, 1927)*; C.A. 23, 3113 (1929)

"The durability of coatings having a basis of drying oil or oil varnish is improved by treating them, after the usual drying with deoxidizing substances such as multivalent phenols or α -naphthol or their mixts. in a volatile solvent which softens but does not dissolve the coating, e.g., solvent naphtha. Urea drvs. also may be used and a small proportion of wood oil with or without stand oil may be added to maintain the surface gloss of the coating." From C.A.

Scheiber, Johannes

PROCESS FOR THE MANUFACTURE OF PAINT OILS OF IMPROVED DRYING PROPERTIES

Ger. 513,309 (Feb. 21, 1928); C.A. 25, 1399 (1931)

. Similar to Brit. 306,452 and 306,453

Scheiber, Johannes

PROCESS FOR THE PRODUCTION OF PAINTING MATERIALS FROM CASTOR OIL.

Brit. 306,452 (May 9, 1930) C.A. 23, 5051 (1929);

"Ricinoleic acid or the mixt. of fatty acids obtained from castor oil are subjected to prolonged heating (suitably in vacuo) to effect splitting off of water which leads to an isomeric linolic acid with conjugated double bonds which is then esterified with glycerol or other polyhydric alc. Excess glycerol may be used and a supplementary esterification effected with rosin, copal or the like." From C.A. The product is compared with wood oil.

Scheiber, Johannes

PROCESS FOR THE PRODUCTION OF PAINTING MATERIALS FROM CASTOR OIL.

Brit. 306,453 (May 9, 1930)*; C.A. 23, 5051 (1929)

This patent "specified subjecting mixts. of fatty acids from good drying oils such as wood oil, linseed oil

or perilla oil and those from semi-drying or non-drying oils to a common esterification with glycerol or other polyhydric alc. (and also if desired to a further esterification with colophony or copal or the like if an excess of glycerol is used." From C.A.

Schladebach, Hermann; and Hähle, Herbert (to I.G. Farbenindustrie, A.-G.)

COATING PREPARATIONS.

U.S. 1, 979,645 (Nov. 6, 1934); C.A. 29, 366 (1935)

"Cellulose laurate about 1-5% is dissolved in a drying oil such as a linseed oil varnish. Cellulose naphthenate, wood oil, pigments, etc., also may be used." From C.A.

Schnorf, Paul (to Hercules Powder Co.)

METHOD OF TREATING ROSIN ESTERS AND PRODUCT THEREOF.

U.S. 2,154,704 (Apr. 18, 1939); C.A. 33, 5686 (1939)

"An ester such as a methyl or glycerol ester of rosin is polymerized in a volatile solvent as by the action of ultraviolet light, an acid such as H_2SO_4 or a salt such as $SnCl_4$ or $ZnCl_2$ and the sepd. polymerized product may be heated with linseed oil, tung oil, etc., to form a varnish. Various details of treatment are described." From C.A.

Schrauth, Walther (to "Unichem" Chemikalien Handels A.-G.)

OIL LACQUER

U.S. 2,059,815, (Nov. 3, 1936) C.A. 31, 562 (1937)

"A major proportion of linseed oil or wood oil is used with alcs. such as oleic alc. or the like or the acetic acid or resinic acid esters of such alcs." From C.A.

Seebach, Fritz (to Bakelite G.m.b.H.)

HARDENABLE OIL VARNISH.

U.S. 1,816,128 (July 28, 1931)*; C.A. 25, 5584 (1931).

"An air-drying fatty oil such as linseed or China wood oil is ground with a reactive phenol-methylene resin until no particles are perceptible between the fingers." From C.A.

Sherk, J.L. and Peterson, N.R. (to Dow Chemical Co.)

BODYING DRYING OILS WITH CELLULOSE ETHERS.

U.S. 2,252,527 (Aug. 12, 1941); C.A. 35, 7740 (1941)

"A product suitable for use in varnish compns. is prepd. by (1) mixing about 1-15% of a cellulose alkyl ether with about 99-85% of a drying oil selected from the group consisting of linseed oil, menhaden oil, oiticica oil, perilla oil, safflower oil, soybean oil, sunflower oil, tung oil treated to retard gelation, and mixts. thereof, (2) heating the oil-cellulose ether mixt. to a temp. of 500-600°F., (3) cooking the mixt. in such temp. range (a) to produce a non-uniform gel, cooled samples of which are immiscible with mineral spirits, (b) continuing the cooking at 500° to 600°F. through an intermediate

physical stage of the oil-cellulose ether mixt. wherein cooled samples are apparently uniform and less rigid gels than those in the first stage and (c) continuing the cooking at 500° to 600°F. to produce a third and final stage of the oil-cellulose ether mixt., whereof cooled samples are clear and flowable, and are miscible with equal wts. of mineral spirits to form clear solns., the product being as homogeneous as, and more viscous than, the same drying oil subjected to the same cooking schedule but without the cellulose ether." From C.A.

Shirley, S.C. (to American Can Co.)

ENAMEL COATING FOR CANS SUCH AS USED FOR HOLDING FOOD PRODUCTS

U.S. 2,055,507 (Sept. 29, 1936)*; C.A. 30, 7884 (1936)

"Containers such as tin cans are coated with a varnish contg. mica and which may also contain ingredients such as rosin, copal gum, heat-treated China wood oil, Mn resinate and "mineral spirits." From C.A.

Sibley, R.L. (to Rubber Service Laboratories Co.)

COATING COMPOSITION AND PROCESS OF PREPARING SAME

U.S. 2,022, 302 (Nov. 26, 1935); C.A. 30, 886 (1936)

Relates to the use of a hydroacridine such as methyl-dihydroacridine in varnishes or the like containing drying oils such as tung oil to control oxidation.

Sibley, R.L. (to Monsanto Chemical Co.)

COATING COMPOSITION.

U.S. 2,099,237 (Nov. 16, 1937); C.A. 32, 374-5 (1938)

"A coating composition containing a drying oil having incorporated therein a positive oxidation catalyst and a controller of oxidation thereof comprising an aldehyde-amine condensation product or derivative thereof." Claim 1 of patent.

An example illustrates its use in a tung oil varnish.

Sloan, A.W. (to B.F. Goodrich Co.)

CONDENSATION PRODUCTS OF DIOLEFINS WITH DIARYLAMINES AND ANTIOXIDANT COMPOSITIONS CONTAINING SAID PRODUCTS.

U.S. 2,419,735 (Apr. 29, 1947); C.A. 41, 4664-5 (1947)

"An antioxidant for org. materials tending to deteriorate in the presence of atm. O, such as fish, linsed, and tung oils; and natural, reclaimed, and synthetic rubbers, comprises a mixt. of alkylated diarylamine with a composite condensation product, prepd. by heating a conjugated diolefin contg. less than 8 C atoms with a diarylamine at a temp. of about 50-300° in the presence of an acidic condensation catalyst, as HCl, H₃PO₄, ZnCl₂, or I₂. The conjugated diolefins include 1,3-butadiene, piperylene; 5-ethyl-1, 3-hexadiene; 2,3-dimethyl-1, 3-butadiene; 2,4-heptadiene; etc. The diarylamines include diphenylamine, phenyl- α -naphthylamine, the ditolyl amines, dixenylamine, anilinoacridine, etc. Best results are

obtained if two mol. proportions of the diarylamine are used for one of the conjugated diolefin, and 0.1 mol. of catalyst per 1 mol. of diarylamine. The reaction temp. may be 50-300° at atm. or elevated pressures." From C.A.

Société des Laques et Matières Plastiques.

SYNTHETIC LACQUERS AND THEIR PROCESS OF PREPARATION.

Fr. 755,422 (Sept. 11, 1933); C.A. 28, 1557 (1934)

"Compds. which are transformable by oxypolymerization into lacquers are made by the union of a polyphenolic compd. with an ethylenic compd., preferably of high mol. wt., and contg. one or more COOH functions (or their immediate derivs.). Thus, compds. are prepd. by condensing pyrocatechol with ricinoleic acid, Et ricinoleate, oleic acid, linoleic acid and oleostearic acid, pyrogallol with ricinoleic acid and hydroquinone with oleic acid, in the presence of condensing agents. The compds. are converted into lacquers by heating." From C.A.

Stamberger, Paul

PRODUCTION OF WATER DISPERSIONS OF DRYING OILS, VARNISHES, AND LACQUERS.

U.S. 2,391,040 (Dec. 18, 1945); C.A. 40, 1049 (1946).

"Stable dispersions contg. oxidized oils in water are obtained without the addn. of neutralizing or buffering agents by oxidizing such dispersions in the presence of dispersing, emulsifying, and stabilizing agents which are stable in both alk. and acidic media. Such agents are of 2 classes; (1) nonionic dispersing, emulsifying and stabilizing agents, such as nonaethlyne glycol mono-oleate or similar esters or polyethylene oxide condensation products with higher fatty alcs. and (2) cation-active materials such as cetyldimethylbenzylammonium chloride, docetyltrimethylammonium bromide, other quaternary NH_4 salts contg. a large hydrocarbon group or other onium salts, such as pyridinium, sulfonium, or phosphonium salts contg. a large hydrocarbon group. Either or both classes of agents may be used. Blown linseed oil, dehydrated castor oil or China-wood oil are dispersed in water with the stabilizing agent and homogenized by known means. O gas under pressure (2 kg. per sq. cm.) is passed through the suspension until no more is absorbed (about 72 hrs.). Acidity increases during the oxidation. In acidic media the by-products of the oxidation are volatile, and films obtained on the evapn. of the dispersions are free of such impurities. In alk. media the by-products are non-volatile. Dispersions may be made in which the particles are either positively or negatively charged." From C.A.

Talmadge, J.M.

ARTICLE COATING PROCESS

Brit. 19,696 (1909) (July 6, 1910)

"A coating process which consists in applying to the body to be coated a film of raw tung oil and then subjecting

the body thus coated to a minimum temperature of 212°F. for a period not to exceed a maximum of 30 minutes, whereby the oil is transformed into an insoluble form which is resistant to water, chemicals, fire, heat, and electricity, substantially in the manner herein set forth." Claim No. 1 of the patent.

Tauber, Curt

PROCESS FOR THE PRODUCTION OF VARNISH PRODUCTS YIELDING WATER - AND ACID-RESISTANT FILMS.

Ger. 558,082 (Oct. 18, 1930); C.A. 27, 857 (1933)

"Varnishes are prepd. from a mixt. of resins or resin deriv. 1, wood oil 1-3 and linseed oil or poppyseed oil 1 part, with addn. of 1-10% of a phenol, calcd. on the linseed or poppyseed oil. The products give films resistant to water and acids." From C.A.

Terisse, Henri

IMPROVEMENTS IN OR RELATING TO THE TREATMENT OF GUMS AND RESINS AND THE PREPARATION OF VARNISHES.

Brit. 14,554 (1903) (Apr. 14, 1904)

This is a method for dissolving resins in drying oils. Hard and semi-hard resins (such as copals) are dissolved in phenol, cresols, or naphthalene. Linseed oil standoil is added to this solution and the phenol or naphthalene distilled off. More linseed or wood oil may be added to dilute the concentrated solution.

Thomas, C.A.

COATING MATERIAL

Can. 340,937 (April 17, 1934)*; C.A. 28, 4256 (1934)

"By use of a drier compn. including β -naphthol incorporated in a metallic drier, tung oil may be used in the production of coating materials with any type of resin and the film from such coating material does not crystallize. By use of β -naphthol prolonged heating of tung oil is rendered unnecessary, and the tung oil may be subjected to the heat required for simple bodying. When phenol or chlorophenol is combined with β -naphthol and incorporated in a metallic drier and used in coating materials, such as varnishes, crystn. of the dried film is effectively prevented, and the color of the material or film is naturally lighter than when naphthol alone is used." From C.A.

Thomas, C.A., and Hochwalt, C.A. (to Monsanto Petroleum Chemicals, Inc.)

PROTECTIVE COATING

U.S. 2,039,364 (May 5, 1936); C.A. 30, 4344 (1936)

"Castor oil is used with a drying oil such as China-wood oil and a synthetic resin which is produced from a fraction of cracked petroleum distillate and which is insol. in alc. and in acetone." From C.A.

Thomas, C.A. (to Monsanto Petroleum Chemicals, Inc.)

PROTECTIVE COATING COMPOSITION.

U.S. 2,035,250 (Mar. 24, 1936); C.A. 30, 3262 (1936)

"A coating compn. comprises tung oil and a phenol-aldehyde resin together with sufficient phenolic inhibitor of crystn. such as β -naphthol to substantially prevent crystn. of the coating film without retarding its normal rate of drying." From C.A.

Thomas, C.A. (to Monsanto Petroleum Chemicals, Inc.)

PROTECTIVE COATING COMPOSITION AND METHOD OF PREPARING THE SAME.

U.S. 2,035,251 (Mar. 24, 1936); C.A. 30, 3262 (1936)

"A protective coating comprising tung oil, a coumarone-indene resin, a drier and a phenolic inhibitor of crystallization, the tung oil being crystallizable in the composition during film drying in the absence of an inhibitor. * *". From the patent.

Turcat, L. [C.T.], and Nuth, Georges

PROCESS FOR THE MANUFACTURE OF ELASTIC PRODUCTS AND SUBSTITUTES FOR NATURAL VARNISH GUMS.

Fr. 404,357 (Oct. 18, 1909)

This French specification is similar to British Patent 23,668 (1909).

A general process is described for the manufacture of elastic or brittle products by the reaction of NH_3 or amines upon the reaction products of the halogenides of sulfur with fatty oils or modified oils. Chinese wood oil is included in the list of suitable oils.

Turcat, L.C.T. and Nuth, G.

IMPROVEMENTS IN PROCESSES FOR THE PREPARATION OF ELASTIC PRODUCTS AND SUBSTITUTES FOR NATURAL LACQUERS OR VARNISHES AND PRODUCTS OBTAINED THEREBY.

Brit. 23,668 (1909). (Oct. 17, 1910)

This process applies to the preparation of elastic or hard products by reacting NH_3 or amines, singly or successively, upon the reaction products of disulfur dihalogenides with fatty oils, oxidized and/or sulfurized fatty oils and greases containing glycerides, with or without catalysts such as sodium acetate. It also pertains to the hardening of these N-containing products by heating, oxidation or vulcanization with S or S-halides.

Turkington, V.H. (to Bakelite Corp.)

COATING COMPOSITION

U.S. 2,076,507 (Apr. 6, 1937) C.A. 31, 3718 (1937)

"A compn. suitable for coating various surfaces comprises a solvent together with a resinous product obtained by the reaction of a phenol and a fatty oil such as tung oil in the presence of $(\text{CH}_2)_6\text{N}_4$ and hexalin (suitably by heating to about 190° or higher). Various examples are given." From C.A.

Sibley, R.L. (to Monsanto Chemical Co.)

COATING COMPOSITION AND PROCESS OF PREPARING SAME.

U.S. 2,099,236, (Nov. 16, 1937); C.A. 32, 374-5 (1938)

"A reaction product of an aliphatic group contg. ketone such as Me Et ketone or diacetone alc. and an aromatic primary amine such as aniline is used with a drying oil such as tung oil (suitably in a proportion of about 0.17%) and serves to inhibit undesired oxidation." From C.A.

Walton, W.T. and Eysenbach, J.W.

COATING COMPOSITIONS AND METHOD OF MANUFACTURE.

U.S. 2,395,925 (Mar. 5, 1946); C.A. 40, 3005 (1946).

"A varnish base is prepd. from an acetic resin which is heated with a polymerized drying oil at 570-90° F. while being blown vigorously with inert gas until 8-30% of satd. acids have been volatilized. Examples are given employing as the resin constituent rosin, polymerized rosin, and ester gum; and as the oil constituent linseed, castor, and soybean oil. Properties, such as drying time, and resistance to water and alk. solns. of varnishes obtained from the above varnish base are comparable to varnishes obtained from stronger resins and (or) stronger oils. Resins and oils in order of decreasing strength are natural resins (dammars and copals), "pure" phenolics, modified phenolics, maleic rosin ester, gum ester, polymerized rosin, limed rosin and rosin; tung, oiticica, dehydrated castor, perilla, linseed, fish, and soybean oils." From C.A.

Wetter, Jasper

PROCESS FOR HARDENING COLOPHONY AND OTHER SOFT RESINS.

Brit. 7625 (1901) (May 18, 1901)

Resin or other soft resins can be hardened by treatment with air with or without (a) drying oils, such as Chinese wood oil or linseed oil, (b) oxygen-transmitters, such as Pt black and salts of Pb and Mn, and (c) pressure.

Wiegand, W.B.

IMPROVEMENTS IN AND RELATING TO THE PRODUCTION OF PAINTS, LACQUERS AND THE LIKE.

Brit. 418,080 (Oct. 18, 1934); C.A. 29, 1665-6 (1935)

"Colloidal dispersions of pigments in paint media, e.g., linseed or China wood oil, pyroxylin, natural or synthetic resins, PhOH-CH₂O condensation products, chlorinated rubber or rubber-like substances such as the reaction products of ethylene dichloride and polysulfide, are obtained by first massing or agglutinating the pigment with the medium and then subjecting the mass in the state of a highly viscous plastic of leather-like consistency to a mech. treatment adapted to set up high shearing stresses therein." From C.A.

Willis, S.L., and Woodford, W.H. (to Remington Arms Co., Inc.)

WATERPROOFING PAPER CARTRIDGE SHELLS.

U.S. 1,738,628 (Dec. 10, 1929); C.A. 24, 967 (1930).

"Chinese wood oil is used with a drier of Mn resinate and Pb oxide, digested in CCl_4 ." From C.A.

Witty, George

ENAMEL.

U.S. 1,823,480 (Sept. 15, 1931)*, C.A. 26, 323-4 (1932)

"The compn. consists of white lead 50-75, ZnO 25-50, BaF_2 5-10, China wood oil 10-15, linseed oil 5-10, turpentine 10-20, gum Manila copal 5-10, EtOH 50-70 and EtOAc 30-50 parts." From C.A.

Wright, W.E.

PAINT COMPOSITION.

U.S., 1,226,934 (May 22, 1917); C.A. 11, 2156 (1917)

"A flat finish paint is made with a lead pigment mixed with not over about 10% its wt. of a vehicle composed of linseed oil 15, soy bean oil or other semi-drying vegetable oil 10, and tung oil 5 parts." From C.A.

Wurbs, Eberhard

PROCESS FOR THE PRODUCTION OF A RUST PREVENTATIVE FROM POWERED METALS OF DIFFERENT POSITIONS IN THE ELECTRO-MOTIVE SERIES, ONE OF THEM BEING IRON, ALSO ALKALINE MATERIALS AND THE USUAL BINDERS.

Ger. 567,349 (Mar. 7, 1926); C.A. 28, 4613 (1934)

"Powd. Fe and another metal or metals, e.g., Pb, are mixed with any of the usual vehicles, e.g., wood oil, together with a sufficient amt. of an alk. substance, e.g., K_2CO_3 to establish an alky. of 0.067-0.2 N;" From C.A.

Zuehl, Dr. Ernst, and Eisemann

PROCESS FOR THE MANUFACTURE OF VARNISHES

Ger. 121,342 (July 4, 1900)

Varnishes can be prepared by melting resins with wood oil, dissolving the product in an inert solvent (optional) and treating it with sulfur chloride. Example: Rosin (2.5 Kg.) is melted with wood oil (2.5 kg.) and SCl_2 (1 kg.) added. The mixture is heated at 100°C . washed with hot water, dried and dissolved in turpentine or benzene. This process yields fast drying coatings of excellent hardness and elasticity which are useful as leather lacquers.

XI. LINOLEUM, FABRIC COATINGS, ARTIFICIAL LEATHERS

Armstrong Cork Co. (Claxton, E.)

IMPROVED MANUFACTURE OF LINOLEUM CEMENT AND LINOLEUM
Brit. 305,656 (July 22, 1930); C.A. 23, 4837 (1929)

"Linoleum cement contg. little unoxidized oil is made by heating a drying or semi-drying oil such as linseed, menhaden, fish, tung or soy bean) in the presence of O and material delaying coagulation (such as rosin, gum kauri, ester gum, abietic acid, pimaric acid and neutral esters of rosin). Various details are given." From C.A.

Armstrong Cork Co.

IMPROVEMENTS IN OR RELATING TO A METHOD OF AND APPARATUS
FOR COATING WEBS.

Brit. 498,600 (Jan. 9, 1939); C.A. 33, 4444-6 (1939)

"Coated webs, particularly floor covering, are obtained by applying to a horizontally disposed base a film of coating material including an oil vehicle having particles dispersed therein, applying heat while the web is still horizontal to cause aggregation of the particles and only after such aggregation with consequent thickening of the film, disposing the web in a nonhorizontal position. In 1 embodiment, a satd. felt base is printed with a paint comprising oil gel, resinoid gel and pigment particles, the vol. of the last being approx. 30% of the nonvolatile portion of the paint. A regenerated oil gel is formed by heating equal parts of linseed and China wood oils to about 565°F. until semi-solid and then stirring in linseed oil (I) with PbO, thinning with I, adding Mn resinate (II) and allowing to cool. A resinoid gel is formed by heating a mixt. of phenol-CH₂O resins with some of the oil gel, adding a little II and thinning with mineral spirits. A heat-bodied oil gel is also formed by heating 2 sep. batches of I to approx. 500°F., adding PbO, with stirring, and raising the temp. to 590°F. and maintaining at 590°F. until the viscosities of the 2 batches are, resp., 150 and 250 poises at 590°F., the batches being then blended and II added when the temp. falls to 450°F. the paint is formed by mixing and grinding in a paint mill lithopone, ZnO, whiting and regenerated oil gel, resinoid gel and heat-bodied gel. Thickening, stiffening and leveling of such paint films is effected by maintenance of the web at 165°F. for 30 sec., after which the web may be transferred immediately to a vertical position without danger of the paint running. The invention may be applied also to heavily pigmented paints to insure leveling and to avoid paint runs." From C.A.

d'Antal, László

PROCESS FOR THE PRODUCTION OF A PLASTIC MASS.

Ger. 538,800 (Oct. 15, 1929); C.A. 26, 2333 (1932)

"Plastic masses specially suitable for the prepn. of linoleum and waterproof fabrics are prepd. by melting vegetable oil with acid mineral oil resins and homogenizing. Resin may be added. Suitable vegetable oils are linseed oil, wood oil, sunflower oil and castor oil." From C.A.

Baldwin, J.T. (to Paulsboro Mfg. Co.).

COATING COMPOSITION AND PROCESS OF PREPARING THE SAME
U.S. 2,153,910 (Apr. 11, 1939); C.A. 33, 5687-8 (1939)

"An oxidized oil gel such as one prepd. from China wood oil and contg. constituents normally insol. in solvents such as toluene and petr. ether is used with an alkali-resistant resin such as a phenol-formaldehyde resin. Glycerol may be added to esterify free acids, and a dispersing agent of low b.p. may be used and then evapd." From C.A.

Beegle, F.M., and Andrews, H.L., Jr. (to Congoleum-Nairn, Inc.).

FLEXIBLE COVERING AND METHOD OF MAKING SAME.
U.S. 2,133,886 (Oct. 18, 1938); C.A. 33, 887-8 (1939)

"A fibrous sheet-like foundation material such as a water-laid felt is impregnated with a bituminous saturant, and to the face of the material there is applied directly an aq. emulsion including water, a drying oil such as China-wood oil, water-insol. and alkali-resistant resin such as a phenol-aldehyde resin, and an NH_4 soap as an emulsifier, the applied emulsion is subjected to treatment causing the water to evaporate, the NH_4 component of the NH_4 soap to be driven off and the oil to oxidize, forming a continuous sealing coat for the bituminized base material, and a decorative and wear-resisting coating is applied." From C.A.

Blenk, J.L.

PROCESS FOR THE MANUFACTURE OF ARTIFICIAL LEATHER BY THE USE OF DRYING OILS.

Ger. 226,866 (Oct. 6, 1908); C.A. 5, 1539 (1911)

"Manuf. of artificial leather by heating a fabric of linen, ramie fiber, or the like in a mixt. of turpentine, naphthalene, spirit of wine, wood oil, linseed oil varnish, as well as other dry oils, gum arabic, oil or fat, with the addition of suitable dye solns. The impregnated material is then covered on one side several times with the mixt., and after drying it is subjected to a protracted treatment with a tanning liquor." From C.A.

See Fr. 421,431 (Wurttembergische Textilwaren und Kunstlederwerke)

Boehm, F., Ltd., and Reihl, C. A.

DRYING OILS.

Brit. 123,792 (Feb. 1, 1918); C.A. 13, 1646 (1919)

"Fatty acids derived from drying and semi-drying oils are converted into a well drying oil by prolonged heating, at a temp. slightly below their b.p. until polymerization sets in. The operation is effected in a reflux condenser and takes 18-24 hrs. The process is accelerated by blowing O through the fatty acids, and by adding a small quantity of Cu, Ni, Co or other finely divided metal or oxide to the charge. Polymerization is aided by the addition of Chinese wood oil, together with a small quantity of a soap of an alk. earth or a linoleate, e.g. linoleate of Ca, Al or Mg. The fatty acids of linseed, cottonseed, Niger, and castor oil may be used. The products are used as linoleum oil, or dild. with turpentine or turpentine substitute, as a waterproofing oil, paint, or varnish." From C.A.

Bonney, R.D., and Laguire, J.F. (to Congoleum-Nairn, Inc.)

TILE COMPOSITION.

U.S. 1,985,201 (Dec. 18, 1934); C.A. 29, 1271-2 (1935)

"A moldable compn. for flooring tile comprises 20-35% of a binder composed of not less than 2 parts nor more than 4 parts of paracoumarone resin and 1 part of gelled China wood oil and 65-80% of filler material including asbestos fiber and pigments." From C.A.

Dewar, A.H., and The Linoleum Manufacturing Co., Ltd.

IMPROVED METHOD OF TREATING WOOD OIL TO FORM PRODUCTS ESPECIALLY USEFUL IN THE MANUFACTURE OF LINOLEUM AND THE LIKE.

Brit. 5789 (1903) (Feb. 11, 1904); J. Soc. Chem. Ind. 23, 328 (1904)

"Tung oil polymerised by heat is mixed with "solidified" (oxidised) linseed oil (***). Resins, oils, siccatives, or the like may also be added, or blown castor oil, rosin oil, & c., may be added at about 180°C. instead of the solidified linseed oil." From J. Soc. Chem. Ind.

Finley, Dozier (to the Paraffine Companies, Inc.)

FLOOR-COVERING MATERIAL

U.S. 1,802,009, (Apr. 21, 1931)*; C.A. 25, 3504 (1931)

"A felt base is made contg. light-colored stock and pigment to produce a light-colored body and it is impregnated with a light colored saturant such as ester gum cooked with China wood oil." From C.A.

Gardner, H.A.

COMPOSITION OF MATTER AND METHOD OF PREPARING SAME

U.S. 1,086,361 (Feb. 10, 1914); C.A. 8, 1353 (1914).

"Making a resilient elastic material for use in tire fillers, linoleum and rubber composition by polymerizing

Chinese wood oil by heating to 280-290° while mixed with 20-30% of a solid filler such as lithopone, baryta, China clay, SiO_2 , talc or CaSO_4 and granulating the solid product produced which is insol. in ordinary oil and varnish solvents." From C.A.

Gardner, H.A.

CEMENT FOR FLOOR COVERING COMPOSITIONS

U.S. 1,831,707 (Nov. 10, 1931)

Oxidized tung oil is mentioned as a material "heretofore" used in the manufacture of linoleum. Its use with chlorinated biphenyl is implied but not definitely specified in the patent.

Hertkorn, J.

PROCESS FOR THE MANUFACTURE OF LINOLEUM AND ARTIFICIAL LEATHER, FROM THE FATTY ACIDS OF DRYING OILS.

Ger. 101,838 (addn. to 100,917) (Feb. 1, 1898)

The fatty acids of drying oils are used alone or with Chinese wood oil, linseed oil or cottonseed oil for the manufacture of linoleum and artificial leather, according to the process of German Patent 100,917. The latter specifies exposure of a mixture of oil and fillers to a current of air or other gases.

I.G. Farbenindustrie, A.G.

PRODUCTION OF NEW SYNTHETIC MATERIALS DESTINED FOR THE IMPROVEMENT OF COATINGS, LACQUERS, AND COATED FABRICS AS WELL AS LINOLEUMS AND OTHER ARTICLES BASED ON OXIDIZED DRYING OILS.

Fr. 738,075 (Oct. 11, 1932); C.A. 27,1773 (1933)

"Oxidized drying oils such as linoxyn or oxidized wood oil are treated with SO_2 or its salts. The products are sol. in water and are rendered insol. by heating. They are used in making varnishes, lacquers, linoleum, etc." From C.A.

Kaempfe, Walter

PROCESS FOR MANUFACTURING A SUBSTITUTE FOR AMERICAN CLOTH OR SIMILAR MATERIALS.

Fr. 445,865 (Sept. 16, 1912)

This specification is similar to British Patent 15,965 (1912). It consists of the substitution of whale oil for the drying oils, commonly wood oil, previously used in the manufacture of leather cloth, American cloth, etc. and of the use of fish oils in the manufacture of varnishes.

Kaempfe, Walter

IMPROVED MANUFACTURE OF AMERICAN CLOTH AND THE LIKE WATERPROOF FABRICS AND SUBSTITUTES FOR LEATHER.

Brit. 15,965, (1912) (June 19, 1913)*; C.A. 8, 256 (1914).

"A substance for use in mfg. waterproof fabrics as substitutes for American cloth, leather, waxed cloth, etc., if prep. by treating animal oils such as train or fish oil with superheated steam at 375-400° until the satd. fatty acids have distilled off and the oil assumes the consistency of varnish. The product may be boiled in an open boiler at about 315° and may be mixed with resins, copal, or varnishes produced from linseed, wood, or other drying oil. The varnish may be mixed with soot and naphtha to form a coating comp." From C.A.

Knoche, L.

IMPROVEMENTS IN LINOLEUM OR LINOLEUM-LIKE COMPOSITIONS. Brit. 12,054 (1897) (March 26, 1898); J. Soc. Chem. Ind. 17, 470 (1898)

"The oil of *elaeococca vernicia* (*aleurites cordata*) is heated to 60°C., an equal weight of ground cork stirred in, the mixture raised to 250° for two hours, and, if desired, some resin, collodion, or castor oil added. The product becomes so plastic and doughy that it can be shaped or moulded in any manner, or it may be spread on canvas in the ordinary fashion. The process is claimed as quicker and cheaper than when linseed oil is employed for linoleum manufacture." From J. Soc. Chem. Ind.

Kronstein, Abraham

PROCESS FOR THE MANUFACTURE OF AN ALKALI-RESISTING LINOLEUM. Ger. 180,621 (Dec. 15, 1901).

This process for the manufacture of an alkali-resisting linoleum consists in solidifying wood oil (by heating) with or without other oils and/or resins. The resulting solid product is mixed with cork powder, pigments, etc., rendered homogeneous on hot rolls and applied to a suitable backing. In one example there was used: cork powder (25 kg), pigment (9 kg) and solidified wood oil (15 kg).

Kronstein, Abraham

A PROCESS FOR THE MANUFACTURE OF LINOLEUM AND LINCRUSTA. Fr. Pat. 327,340 (Mar. 24, 1903) J. Soc. Chem. Ind. 22, 918 (1903)

"Wood oil, with or without some resin and other drying oil, is used as the basis of the composition for linoleum or "lincrusta." It is preferable to make some addition of oil or resin to the wood oil, because if the latter is employed alone, the temperature of working must not be permitted to exceed 220°C. whereas with a suitable diluent the mass may be rendered insoluble at 300°C. The finished material is said to resist alkalis better than usual." From J. Soc. Chem. Ind.

Kronstein, Abraham

IMPROVED MANUFACTURE OF LINOLEUM, LINCRUSTA, OR THE LIKE.
Brit. Pat. 26,371 (Nov. 26, 1903); J. Soc. Chem. Ind.
23, (1904)

This patent is essentially the same as Fr. 327,340.
(Kronstein).

Kronstein, Abraham

PROCESS FOR THE MANUFACTURE OF ALKALI RESISTANT LINOLEUM
Ger. 204,398 (Dec. 28, 1906; C.A. 3,960 (1909)

This patent is supplementary to Ger. 180,621 (Kronstein) and covers the process of freeing drying oils (except wood oil) from their solid fats by a fractional distillation, solidifying the thickened oils and utilizing the product in the manufacture of linoleum.

Lender, Rudolf.

PROCESS FOR THE MANUFACTURE OF BINDERS FOR PIGMENT COLORS, GROUND CORK AND LIKE MATERIALS, AS WELL AS OF VARNISH-LIKE PRODUCTS, FROM WOOD OIL.

Ger. 245,634 (Jan. 4, 1911); C.A. 6, 2334 (1912)

"In the production of a vehicle for pigment colors, cork meal, and the like, also lac-like products from wood oil, wood oil 10 kg. is heated to 200-240°, and then an equal amt. of the polymerization products of coumarone is added. Properties of the product are specified." From C.A.

Lender, Rudolf

AN IMPROVED MANUFACTURE OF BINDING AGENTS FOR PIGMENT COLORS, GROUND CORK, AND LIKE MATERIALS AND ALSO LACQUERS, VARNISHES AND LIKE PRODUCTS.

Brit. 21,667 (1911)(Dec. 14, 1911); C.A. 7; 1109 (1913)

"In the manuf. of varnishes, paints, etc., and the production of linoleum etc., Chinese wood oil is heated to 220-240° and mixed with the polymerization products of indene and coumarone. The solid mass obtained on cooling is dissolved in certain solvents thus producing lacquers, varnishes, binding agents for pigments, ground cork, etc., and for use in the manuf. of linoleum and lincrusta." From C.A.

Lender, Rudolf.

METHOD FOR THE PREPARATION OF BINDERS FOR PAINTS, CORK-MEAL, AND THE LIKE, AND ALSO VARNISH-LIKE PRODUCTS FROM WOOD.

Dutch, 138 (Mar. 2, 1914); C.A. 8,2497 (1914)

"In a process of mfg. a binder for paint pigments and ground colors, etc., the gummy or resinous products of wood oil are mixed with the material under treatment, preferably with the addition to the wood oil residues of

polmerization products of "indene" and "coumarone." From C.A.

Lilienfeld, Leon

PROCESS FOR THE MANUFACTURE OF IMITATION LEATHER.
Fr. 456,261 (June 13, 1913); C.A. 8, 2277 (1914) (no abstract)

Artificial leather of improved stability is formed by coating paper or fabrics with a composition of nitrocellulose and esters of phenols (e.g. ortho-tricresyl phosphate) which remain liquid at 0° C. Products of greater softness, flexibility and luster are made by application of the above composition with alternate layers of a material composed of viscose and a condensate of Chinese wood oil with aromatic amines.

Lilienfeld, Leon

ARTIFICIAL LEATHER.
Brit. Pat. 28,210 (1912), (Mar. 6, 1914); C.A. 8, 1886 (1914).

Artificial leathers are manufactured using layers of plasticized cellulose esters alternating with layers composed of a mixture of viscose and the products obtained from Chinese wood oil and aromatic amines according to the process of British Patent No. 626 (1910).

Lilienfeld, Leon

ARTIFICIAL LEATHER AND PROCESS OF MAKING THE SAME.
U.S. 1,140,174, (May 18, 1915); C.A. 9, 1856 (1915)

"Artificial leather" is made by coating paper or cloth with alternating layers of celluloid soln. mixed with o-tricresyl phosphate and a mixt. of viscose with the condensation product formed from Chinese wood oil 100 and o-toluidine 200 parts by the action of heat and $ZnCl_2$, emulsified with Na sulforicinoleate." From C.A.

M.V. Industriele Maatschappij voorheen Noury & van der Lande
IMPROVEMENTS IN AND RELATING TO THE PRODUCTION OF LINOXIN-LIKE PRODUCTS.

Brit. 471,030 (Aug. 26, 1937); C.A. 32, 1499 (1938)

"Linoxin-like products are obtained by thickening drying or semidrying oils by oxidation and then incorporating a small amt. of a strong acid, e.g., H_2SO_4 , H_3PO_4 , mono- or polysulfonic acids having fatty or aromatic radicals. Before blowing, the oil may be polymerized by heating. Linseed, tung, perilla, soybean, cottonseed or fish oil is blown with air at 100-400° for 3-12 hrs. and the product mixed with several small amts. of H_2SO_4 until up to 1% is added. The final gelatinized product may be further heated at 50-100° for 3-10 hrs., or this step may be effected while the acid is incorporated. The treated oils may be used in the manuf. of linoleum,

artificial leather, etc., etc., by adding fillers, pigments and binders." From C.A.

Phillippi, D.M. (to Kay & Ess Co.).

ENAMEL IMITATION LEATHER FINISH.

U.S. 1,878,316 (Sept. 20, 1932); C.A. 27, 434 (1933).

"A mixt. of China wood and linseed oils is heated to about 250°, then cooled, incorporated with PbO, held at a temp. of about 238-243° for about 30 min., Mn linoleate and Co linoleate and a synthetic resin being then added, and the temp. thereafter restored to about 210°." From C.A.

Shipp, Charles

IMPROVEMENTS IN OR RELATING TO COVERINGS FOR DRAWING ROLLS FOR FIBROUS MATERIALS.

Brit. 17,430 (1903) (Sept. 24, 1903)

This patent applies to the use of Chinese wood oil boiled with resinous matter and ground up cork for a covering for drawing rolls. Example: Chinese wood oil (100 parts) and resin (15 parts) are heated together at 350° F., cooled, and mixed with powdered cork (115 parts) and vegetable black (10%). The product is rolled onto a fabric and used to cover drawing rolls.

Shipp, Charles.

IMPROVEMENTS IN OR RELATING TO COVERINGS FOR DRAWING ROLLS FOR FIBROUS MATERIALS.

Brit. 19,066 (1904) (Oct. 6, 1904) *

This patent, an improvement upon Brit. 17,430 (1903), applies to the use of a mixture of boiled Chinese wood oil and boiled oxidized linseed oil in resilient coverings for drawing rolls. Example: Boiled Chinese wood oil (20 parts), boiled linseed oil (65), Kauri gum (15) and resin (12) (optional) are combined hot to form a cement. This cement (100 parts) is combined with pulverized cork (80) and a little vegetable black.

The product is spread about 1/32 in. thick with hot rollers onto fabric which is later applied to drawing rolls.

Smith, V.H.

COMPOSITION OF MATTER

U.S. 837,351 (Dec. 4, 1906); C.A. 1, 649 (1907)

A composition useful for the manufacture of artificial leather is composed of tung oil 5, stearic acid 3, acetone 50, nitrocellulose 20, pigment 12, pulverized leather 10.

Turkington, V.H. (to Floor Covering Patents, Inc.)

FLOOR COVERING

U.S. 1,988,616 (Jan. 22, 1935); C.A. 22, 1667 (1935)

Relates to a "process of prepg. a compn. for coating floor covering, air being bubbled through the oil-phenolic mixt. during heating." From C.A.

Wallen, E.E.

THE PRODUCTION OF FLAT OR SEMI-FLAT FINISH OF ANY COLOUR ON OILCLOTH, FLOORCLOTH, OR THE LIKE.

Brit. 217,255 (June 4, 1924); C.A. 19, 409 (1925)

"A compn. for producing a flat or semi-flat finish on oilcloth or other materials comprises Co resinate, china-wood oil, linseed oil, resin ester gum or copal ester gum, pigments such as BaSO_4 , yellow ochre, lemon chrome or Prussian blue and turpentine or other thinner. The Co resinate may be prepd. by ppn. by adding CoSO_4 soln, to a soln. of rosin in NaOH." From C.A.

Wurttembergische Textilwaren und Kunstlederwerke (Blenk, J.K.)

PROCESS FOR THE MANUFACTURE OF ARTIFICIAL LEATHER

Fr. 421,431 (Dec. 22, 1910)

An artificial leather is made by boiling a fabric in a solution of a drying oil (e.g. wood oil, linseed oil, varnish oil) and coloring material in a turpentine, alcohol or naphthalene. The impregnated fabric is then coated several times with the same composition and the product treated with a tanning solution. See Ger. 226,866 (Blenk, J. K.)

RUBBER SUBSTITUTES, PUTTIES, AND PLASTIC MASSES

d'Almeida, G.

NEW OR IMPROVED COMPOSITION AND RUBBER SUBSTITUTE, FOR WATER-PROOFING AND THE LIKE, AND PROCESS FOR PREPARATION.

Brit. 14,665 (1913) (June 19, 1913); C.A. 8, 264 (1914)

"In the manufacture of plastic and liquid compositions, "Tam Ti" powder and "Tang Iu" oil are mixed together for various purposes; or the latter may be boiled alone or with waste or bamboo paper for the manuf. of a rubber substitute. "Tam Ti" powder is obtained from a quartz, containing Au or Ag or both, by grinding, burning, and, after removal of the metal, crushing the resulting hard mass. "Tang Iu" oil is extd. from the nut of Alcurites fordii. The preferred method of mixing is as follows: 1 lb. of oil is boiled over a slow fire for from 3 to 4 hrs., from 5 to 6 drams of powder are added, and the mixt. is stirred until cool and thick. This product may be used for waterproofing, preserving, etc. By b. slowly for a long period, or by b. quickly, lumps of a rubber substitute are obtained. The mixt. is adapted to the following uses: It may be mixed with paper and molded into articles usually made of rubber, such as tires, balls, and toys. Enamels or paints may be improved and waterproofed by adding a portion of the mixt.; silk, linen, cloth, canvas, leather, and paper may be coated with the mixt. for making wearing apparel, tents, tires, boats, water-carrying bags, flags, linoleum, curtains, roofing material, and, more particularly, articles which it is desired to waterproof; elec. wires and cables may be waterproofed and insulated; kinematograph films may be made by coating paper, silk, etc., bearing pictures; and silk, etc., may be rendered transparent." From C.A.

Amos, J.L., and Morris, E.D. (to Dow Chemical Co.)

PUTTY COMPRISING A LIQUID MONOMER AND A FINELY DIVIDED SOLID INSOLUBLE POLYMER

U.S. 2,482,825 (Sept. 27, 1949)

Among the examples of liquid, polymerizable monomers mentioned in the general discussion are drying oils such as tung oil. The latter are not covered by the single claim.

Blakeman, W.N.

IMPROVEMENTS IN OILS AND FATS AND COMPOUNDS THEREOF.

Brit. 9023 (1911) (Apr. 11, 1912); C.A. 6, 2855 (1912)

"Fatty oils and fats, such as linseed, tung, cotton, sunflower, corn, and menhaden oils, or derivs. thereof, such as oleic acid, stearic acid, and stearin, are combined with chlorinated hydrocarbons, or chlorinated derivs. of hydrocarbons, contg. more than 10 at., such as chlorinated ethylene, benzene, naphthalene, anthracene, crude petroleum and its distillates, ozocerite, asphalt, paraffin, coal tar, and retort residues, and the mixt. is used as a vehicle for comminuted vegetable, metallic, and mineral matter, in the manuf. of paints, etc., linoleum, oilcloth, roofing, paving, artificial

lumber, fatty cements and putty. The fatty oils and fats may be hydrated, rancidified, oxidized, or chlorinated. The hydrocarbons, etc., may be chlorinated by passing Cl through them in a tall column until the color deepens slightly; or by exposing them in broad surfaces to the action of Cl, using heat, pressure, and agitation if necessary, or by the decomp. of NaCl; in the case of naphthalene, a carrier, such as Fe or Sb, may be used to assist the process. Examples of the comminuted matters that may be mixed with the oil, etc., and chlorinated hydrocarbon, etc., are SiO₂, Zn silicate, Ca obsidian, Pb sulfite, clay, cellulose, minerals, and resins." From C.A.

Burg, A.R. van der

CAOUTCHOUC SUBSTITUTE AND PROCESS FOR ITS MANUFACTURE.
Fr. 419,786 (Nov. 4, 1910)

This specification duplicates British Patent 16,758 (1910). The single claim is translated as follows:

"A rubber substitute, and its process of manufacture, obtained by mixing, in suitable quantities, wood oil and resin oil and subjecting this mixture to a temperature sufficiently high to convert it into a plastic mass."

Burg, A.R. van der

AN IMPROVED SUBSTITUTE FOR RUBBER AND THE LIKE.
Brit. 16,758 (1910) (Dec. 1, 1910)

A rubber substitute can be manufactured by combining wood oil and resin oil and heating the product until it solidifies. In an example. wood oil (100 parts) and resin oil (15) are heated at 260° until the product resembles rubber. This specification is very much like French Patent 419,768 (van der Burg, 1910).

Burg, A.R. van der

PROCESS FOR MANUFACTURING A RUBBER SUBSTITUTE.
Austria 51,770 (Sept. 1, 1911)

"Claim: the process for manufacturing a rubber substitute by heating a mixture of wood oil with the products of resin distillations, by subjecting a mixture of wood oil and ordinary fir resin oil [Fichtenharzol] to a temperature of 260°C. until conversion to a plastic mass results." Translation of the sole claim of the patent.

Butler, J.W.

AN IMPROVED INDIA RUBBER SUBSTITUTE
Brit. 23,210 (1911) (Dec. 20, 1912); C.A. 7, 1299 (1913)

"An India rubber substitute is made from a mixt. of preferably 8 parts of tar, 9 of bitumen, 8 of soybean oil, 3 of vaseline, paraffin wax, etc., 10 of talc or the like, 7 of asbestos, 2 of MgO, 2 of kauri gum, and 6 of S. Chinese wood oil 9, and resin 2, may also be added." From C.A.

Chemische Fabrik Liegnitz, Meusel & Co.

PROCESS FOR MANUFACTURING PLASTIC MASSES FROM FATTY DRYING OILS, ESPECIALLY LINSEED OIL

Ger. 201,966 (Feb. 24, 1907); C.A. 3, 494 (1909).

A solid wax- or rubber-like mass is obtained by heating at 110°-120°C. a mixture of 0.5-1.0% of a powdered metal, eg, Mg or Fe, with poppyseed oil, wood oil, cottonseed oil, hemp oil or varnish oil.

Cowan, J.C., and Wheeler, D.H. (to United States of America)

LINEAR SUPERPOLYESTERS.

U.S. 2,429,219 (Oct. 21, 1947); C.A. 42, 1755 (1948).

"Dimeric fat acids from heat-bodied vegetable oils were condensed with glycols to form polymers with rubberlike characteristics. For example, a mixt. of 33.8 g. corn oil (I), 4.869 CH₂OHCH₂OH (II), and 15 mg. p-toluene sulfonic acid was heated at 175-30° for 9 hrs., then at 195° for 17 days with stirring and under N₂ atm. The resulting 24,000 mol. wt. polymer was sol. in CHCl₃ and was elastic at -50°. Soybean oil fat acid (III) (31.27 g.) decamethylene glycol (9.72 g.) and 0.25% Zn salt of fat acid at 225° for 15 hrs. gave a 20,000 mol. wt. polymer which was sol. in CHCl₃ and could be vulcanized. Similarly fat acid from tung oil, and tetraethylene glycol (IV) gave a 24,900 mol. wt. polymer. Methyl esters of fat acid from dehydrated castor oil, II, and Zn salt at 185° gave a 15,000 mol. wt. polymer. Adipic acid, acid from safflower oil, and hexamethylene glycol produced a polymer of 16,000 mol. wt. Citraconic anhydride, I, and IV produced a polymer of 11,000 mol. wt. Ethylene diamine and III produced a polymer with 10,500 mol. wt." From C.A.

Eckey, E.W., and Taylor, J.E. (to Procter & Gamble Co.)

HIGH MOLECULAR POLYHYDRIC ESTERS

U.S. 2,413,613 (Dec. 31, 1946); C.A. 41, 2279-80 (1947)

"These polymers (mostly dimers) are prepd. by the addn. polymerization of unsatd. acids or their esters. A metal soap of the polymer is made and reduced to the alcohol. Soybean oil was polymerized by blowing steam through the oil for 6 hrs. at 300° and 5 mm. pressure. After cooling, the polymer was saponified with KOH, acidified with HCl, washed, and dried. The unpolymerized fatty acids were steam-distd. from the polymer at 275° and 3 mm. The residue (51% of the charge) was heated and agitated with litharge, to produce the Pb soap. This was heated, over 2 hrs., to 340° under H pressure and then agitated for 15 min. at 4000 lb./sq. in. to reduce the carboxylic groups to methylol. The hydrogensate was boiled in 10% HCl and then washed free of HCl. The product consisted of free alcs. and the fatty acid esters of these alcs. If a hydrogenation catalyst or the Cu soap is used, the double bonds in the polymer are satd. If a hydrogenation catalyst is used, the free polymerized fatty acids from the saponification are used and not their metal

soaps. Use of the Cd soap approx. doubles the hydrogenation time and increases the ester content of the hydrogenate. Similar examples are given for the use of linseed and of tung oils. The produce is useful in surface coatings and as rubber." From C.A.

Ellis, Carleton (to Ellis-Foster Company)

WOOD OIL PUTTY.

U.S. 1,029,800 (June 18, 1912); C.A. 6, 2500 (1912)

"Self-setting putty containing mineral oil 80, wood oil 20 and whiting 400 parts." From C.A.

I.G. Farbenindustrie, A.-G.

MANUFACTURE OF COATING PREPARATIONS AND ARTIFICIAL MATERIALS. Brit. 326,482 (Mar. 10, 1930); C.A. 24, 4945 (1930)

"A cellulose ester of an acid of high mol. wt. contg. at least 7 C atoms such as a fat acid, naphthenic acid or resin acid is dissolved in linseed oil, linseed oil varnish, wood oil or other suitable drying oil, and pigments and modifying agents, diluents, etc., also may be added, to form coatings for different materials, for making plastic fillers, etc." From C.A.

I.G. Farbenindustrie A.-G.

PROCESS FOR THE PREPARATION OF VARNISHES AND PLASTIC COMPOSITIONS.

Fr. 787,690 (July 8, 1935); C.A. 30, 1248 (1936)

"Varnishes and plastics are made by mixing linseed oil, wood oil, chlorinated rubber, natural or artificial resins or cellulose derivs. with viscous or solid chlorinated aromatic compds. contg. at least 1 cyclic methylenic group, e.g., chlorinated compds. of tetra- and deca-hydronaphthalene, acenaphthene, fluorene, benzanthrene, indene, etc. The mixt. is preferably effected in the presence of solvents. Pigments, fillers, etc. may be added." From C.A.

Kelly, T.D.

IMPROVED COMPOSITION FOR USE AS A RUBBER SUBSTITUTE OR GLUE OR LIKE FLEXIBLE CEMENT.

Brit. 8613 (1911) (May 6, 1912); J. Soc. Chem. Ind. 31, 595 (1912)

"One hundred parts of 'peat of a gummy nature,' or of linseed or cotton-seed or of certain plants such as marsh mallow, are boiled in a 3 to 5 per cent solution of lime or other alkali until of the consistence of thick cream, and if necessary the fibre is strained off. 30 parts of the substance thus obtained are then heated with 70 parts of vegetable oils in a steam-jacketed pan to a temperature of 450°-600°F., or the mixture is heated with 30 parts of nitric acid or of a mixture of 3 parts of nitric acid and 1 part of sulphuric acid at 100°-200°F. Tung seed oil when employed, is

heated to 410°-600°F. before use. Either of the substances may be treated with a 5 per cent alkaline solution to remove greasy by-products. Rubber substitute is made by adding to either of these compositions (after straining), 1 to 50 per cent of its bulk of sulphur or substances containing sulphur such as potassium sulphate, heating the mixture and compressing it in moulds. Water-and fire-proof flexible cement or glue is made by adding to either composition 10 to 30 per cent of chalk, or Portland cement." From J.Soc.Chem. Ind.

Lilienfeld, Leon

PROCESS FOR THE MANUFACTURE OF PLASTIC MASSES.

Ger. 246,443 (Jan. 11, 1910); C.A. 6, 2549 (1912)

"Mfg. plastic masses by heating wood oil or the wood oil fatty acids or their substitution products, esters, or salts with amino derivs. of aromatic hydrocarbons with a suitable condensation agent, in the presence or absence of H₂O. A small amt. of H₂O is necessary to prevent too violent a reaction. After the reaction is concluded, the reaction mass is allowed to cool, thereby acquiring the desired consistence, whereupon it is washed out with H₂O. According to the proportion of the aromatic amine and the condensation agent to the wood oil, the temp., and the duration of the reaction, products are obtained which are similar to thickened oils, caoutchouc, gutta-percha, or balata, or plastic masses such as celluloid or finally resin, and which serve as substitutes for these or for admixture therewith." From C.A.

Lilienfeld, Leon.

PROCESS FOR THE MANUFACTURE OF PLASTIC COMPOSITIONS.

Fr. 417,392 (Aug. 30, 1910); C.A. 7, 1987 (1913)

"In the manuf. of resin- or caoutchouc-like plastic substances, fats or fatty acids or drying oils, especially China wood oil, or fatty acid esters of polyhydric alcs. (lanolin) are treated with amino or hydroxyl derivs. of aromatic hydrocarbons. E.g., heat a mixt. of China wood oil 1 kg., o-toluidine 1 kg., ZnCl₂ 60-100 g., to 200-300° until it is consistent. After cooling the mass forms a caoutchouc-like product. These products have a higher m.p. and hardness, as well as elasticity, by treating them with HCHO." From C.A.

Lilienfeld, Leon

PROCESS FOR THE MANUFACTURE OF PLASTIC MASSES.

Austria 47,237 (Nov. 1, 1910)

This process for the manufacture of plastic masses consists of heating Chinese wood oil or wood oil fatty acids, or their substitution products, esters or salts with amino or hydroxy derivatives in the presence of suitable condensing agents. The products obtained may resemble oils, rubber, balata or horn. In example V, 1 kg. of o-toluidine, 1 kg. of Chinese wood oil, and 150-200 g. of ZnCl₂ (preferably dissolved in 60-100 g. of water) are heated together until a sample, on cooling, shows a resinous consistency.

Lilienfeld, Leon

PROCESS FOR THE MANUFACTURE OF PLASTIC MASSES,
Austria 47,238 (Apr. 10, 1911) (Addn. to 47,237).

"Claim: Process for the manufacture of plastic masses according to the main patent No 47,237, consisting in using other fats or oils, or fatty acids or esters of fatty acids with higher alcohols in place of wood oil or wood oil fatty acids. Translated from the patent.

Lilienfeld, Leon

MANUFACTURE OF NEW PRODUCTS APPLICABLE AS SUBSTITUTES FOR OILS, CAOUTCHOUC OR RESINS AND FOR LIKE SUBSTANCES.
Brit. 636 (1910) (Feb. 22, 1912)

"The herein described manufacture of new products applicable as substitutes for oil, caoutchouc, resins or the like, by treating drying oils, particularly Chinese wood oil, or their fatty acids, or their derivatives, with amido-derivatives of aromatic hydrocarbons or with their derivatives and a suitable condensing agent." Claim No. 1 of the patent.

Lilienfeld, Leon

PROCESS OF MANUFACTURING SUBSTITUTES FOR OILS, CAOUTCHOUC, RESINS, ETC.,

U.S. 1,027,158 (Aug. 27, 1912); C.A. 6,3333 (1912)

Making a substitute for oils, caoutchouc, resins, etc., by heating together wood oil, o-toluidine and zinc chloride.

Lilienfeld, Leon

PROCESS OF MANUFACTURING COMPOSITIONS OF MATTER.

U.S. 1,090,730 (Mar. 17, 1914); C.A. 8, 1680 (1914).

"Making a plastic composition by heating wood oil 100 with o-toluidine 100-200 parts to 80°, together with a condensing agent such as a 50% ZnCl₂ soln., 22 parts and treating the liquid reaction product with CH₂O, after raising the temp. of the mixt. to 260-290° to distil off the excess of toluidine and form a resinous mass." Abs. from C.A.

Radcliffe, John

IMPROVEMENT IN COMPOSITIONS CONTAINING PITCH.

Brit. 4589 (1911) (Feb. 23, 1912); C.A. 6, 2312-3 (1912)

"A plastic composition approximating in properties to natural asphalts and bitumens is formed by incorporating finely divided wood, cellulose, peat, or like organic matter with pitch, in proportions up to the point at which the composition becomes liquefiable by heat, with or without the addition of oil. The amt. of cellulose material varies with the quality of the pitch, pitches contg. a small quantity of infusible material requiring more cellulose than those contg. a large quantity. Examples are given." From C.A.

"The most convenient materials to use however consist in cellulose naturally containing oils for example seeds

such as cotton seed, linseed, tung beans, soya beans and like. These are reduced to a fine state and the residual cake after crushing to obtain the oils may be employed. Such cake still contains oil. The cake may be broken up and sieved to reject the large portions, or it may be ground up with hard pitch to make it very fine." From the patent.

Repin, Charles

PROCESS FOR THE TREATMENT OF CAOUTCHOUC GUTTA PERCHA AND OTHER VARIETIES OF NATURAL ELASTIC RUBBER

Ger. 106,727 (May 27, 1898);

Tung oil is solidified by heating to about 250° and incorporated into natural rubber as an extender.

Repin, Charles

IMPROVEMENTS IN THE TREATMENT OF INDIA RUBBER, GUTTA PERCHA AND OTHER NATURAL ELASTIC SUBSTANCES.

Brit. 12,327 (1898) (Aug. 27, 1898); J. Soc. Chem. Ind. 17, 933 (1898)

"Tung oil, with or without the addition of linseed or other oil, is gradually heated to 250°C., when it is converted into a solid body. The residue is moistened with "petroleum" to render it more friable, and, after the hydrocarbon has evaporated, the dried oil is mixed with india-rubber, &c., and the solidification completed by heat or some compound of sulphur." From J. Soc. Chem. Ind.

Rogler, Alfred

PROCESS FOR THE PRODUCTION OF HIGH GLOSS PLASTIC MASSES FROM LINSEED OIL AND WOOD OIL.

Ger. 491,728 (Sept. 15, 1927); C.A. 24, 2558 (1930)

"Addn. to 445,799. Glossy porcelain-like masses are obtained by treating linseed or wood oil with a Zn salt of benzoic or cinnamic acid, instead of the acid alone, as in the method of 445,799. In an example, linseed oil with aminobenzoic acid, ZnO and lithopone." From C.A.

Scholz, V. and Atlas Agro Chemische Fabrik A.-G.

PROCESS OF PREPARING LINOXYN OR MATERIALS SIMILAR TO LINOXYN

Brit. 332,257 (July 14, 1930); C.A. 25, 224 (1931)

"Linseed oil or other suitable drying or non-drying oil contg. unsatd. groups or their fatty acids is blown with air or other O-contg. gas until no further oxidation or polymerization can take place by this means and the product is then kneaded with air to carry the oxidation and polymerization still further and produce a light colored, granular material of relatively high m.p. The process may be carried out in the presence of a small proportion of a catalyst such as PbO or Pb linoleate at temps. of 60-150° and the kneading may be at a temp. of about 100°. Org. bases such as aniline, naphthylamine or urea may be added during the blowing or kneading, as may also resins, pigments, fillers, etc.

Numerous examples and details of procedure are given." From C.A.

Société Bonneville & Co.

MANUFACTURE OF A CEMENT WITH A BASE OF ZINC FOR HOT JOINTS.
Fr. 332,788 (Sept. 3, 1903)

A cement for hot joints such as those in steam pipes is composed of zinc dust and a drying oil. Wood oil gives the hardest joints but boiled linseed oil can be used. Example 1: Gray zinc (90-92), wood oil (8) or boiled linseed oil with Mn drier (8), and chopped hemp, waste or cow hair (150) (optional).

Steinitzer, F.

PROCESS FOR THE MANUFACTURE OF A SOLID MATERIAL FROM CHINESE WOOD OIL, SUITABLE AS A FILLER FOR RUBBER OR SIMILAR USES, AND OF AN OIL, WHICH DOES NOT GELATINIZE ON HEATING.
Ger. 200,746, (Nov. 28, 1907); J. Soc. Chem. Ind. 27, 988, (1908)

"If Chinese wood oil be treated with sulphuric acid of Sp. gr. between 1.597 and 1.759, preferably 1.688, there is stated to be no evolution of heat and no formation of sulphur dioxide, but a brownish solid mass is obtained, from which the sulphuric acid can be completely removed by washing with water, leaving a yellowish powder of faint odour and neutral reaction, and containing no sulphur. This product does not melt, but chars when heated. It is insoluble in water and the usual solvents for fat, but is capable of absorbing considerable quantities of liquids, and of withdrawing dyestuffs, salts, etc., from their solutions. It can be used as a loading material for rubber, as a vehicle for medicinal preparations, etc. It can be readily saponified with caustic alkalis or alkali carbonates, and from the resulting soap, on treatment with acid, there separates a thick reddish-brown drying oil, miscible with alcohol in all proportions, which does not gelatinise on heating." From J. Soc. Chem. Ind.

Turcat, L. and Nuth, G.

PROCESS FOR THE MANUFACTURE OF ELASTIC PRODUCTS AND SUBSTITUTES FOR NATURAL VARNISH GUMS.
Fr. 435,650 (Jan. 4, 1912)

This specification covers the process of making factice-type products by the reaction of ammonia or amines upon the reaction products of halogen derivatives of S, on natural or processed fatty oils. It is broader in scope than Fr. 404,357 since it includes products from tertiary amines and sulfur-halogen compounds other than SCl_2 . Chinese wood oil is one oil in a long list of suitable ones.

Whiting, L.R. (to Bakelite Corp.)

MODIFIED DRYING-OIL COMPOSITIONS, METHODS OF MAKING THE SAME AND METHODS OF COATING AND UNITING SHEET MATERIALS THEREWITH.

U.S. 2,480,206 (Aug. 30, 1949); C.A. 43, 9484 (1949)

"Conjugated drying oils can be polymerized to an infusible solid state at low temps. and in short times by use of a catalyst system contg. an oxy compd. of B and an org. acid or anhydride, such as oxalic, salicylic, lactic, or citric. A combination of hydrated oxalic acid and H_3BO_3 when fused together at 135° and used to the extent of 10 g. in 60 cc. of tung oil causes gelation in 5 min. at 99° . This technique can be applied to formation of laminates. Cut sheets of cotton duck are dried at 135° (to remove H_2O which would lessen the activity of the catalyst) and are impregnated at room temp. with tung oil in which is dispersed a catalyst compn. consisting of Am_3BO_3 2 and anhyd. $(COOH)_2$ 3%, based on the wt. of the oil. The sheets are stacked between glass platens and lightly compressed with clamps. After heating the assembly for 1 hr. to polymerize the oil, the plates are removed, and a sheet with smooth glossy surfaces and flexibility is left. It could be installed without fracturing over curved surfaces. The hardness of the polymerized oil gels can be increased by incorporating certain resins with them. A mixt. of equal parts of tung oil and an oil-sol., non-heat-hardening, p-PhC₆H₄OH-HCHO resin is heated to 150° ; a viscous, thermoplastic mass is obtained when the mixt. is cooled to room temp. This material is then reheated to about 100° to liquefy it, and 1 g. anhyd. $(COOH)_2$ and 5 cc. Am_3BO_3 are added for each 100 g. Continuation of heating results in gelation when the temp. reaches 150° . The product is hard and resilient."

From C.A.

Zuehl, Dr. E., and Eisemann

PROCESS FOR THE MANUFACTURE OF A SUBSTITUTE FOR CAOUTCHOUC AND GUTTA PERCHA

Ger. 119,635 (May 6, 1900)

Substitutes for rubber or gutta-percha are made by treating with SCl_2 mixtures of wood oil with pitch, or asphalt and paraffin (optional). Example: the product obtained by heating pitch (2 kg.) and wood oil (1 kg.) in an autoclave for 8 hrs. at $260^\circ C$. is vulcanized with SCl_2 .

Zuehl, E.

A NEW OR IMPROVED PROCESS FOR PRODUCING A SUBSTITUTE FOR INDIA RUBBER AND GUTTA PERCHA.

Brit. 18,536 (1900); (Dec. 8, 1900).

A substitute for natural rubber and gutta-percha is made by incorporating pitch or asphalt into wood oil adding S_2Cl_2 and/or S and heating until the product solidifies. In example 2, pitch (2 kg.) and wood oil (1 Kg.) are heated for 8 hrs. at 280° and then vulcanized with 150 gms. of S_2Cl_2 .

XIII MOLDING, LAMINATING, AND CASTING COMPOSITION, BRAKE LINING.

Baekeland, L.H.

MOLDED ARTICLE AND METHOD OF MAKING SAME.

U.S. 1,372,114 (Mar. 22, 1921); C.A. 15, 1975 (1921)

"Tung oil is heated to a relatively high temp. (preferably about 205-210°) without solidification, mixed with a filler such as sillex, asbestos and wood flour and the mixt. is molded and baked, and then given an external coating of insol. material e.g., asphalt or phenolic condensation product. This method is adapted for the manuf. of elec. insulators." From C.A.

Bakelite Corp. (Groff, Frazier)

IMPROVEMENTS IN OR RELATING TO MOULDING MIXTURES COMPRISING SYNTHETIC RESINS.

Brit. 365,100 (Application, July 5, 1930; not accepted); C.A. 27, 1775 (1933)

"Potentially reactive resinous comps, are made by (1) heating a phenol with a fatty oil in the presence of a "promoter," e.g., H_3PO_4 (2) treating the products of (1) with a further quantity of phenol and a methylene-contg. agent, (3) heating a phenol, tung oil, restricted amts. of a methylene-contg. agent, and a catalyst, e.g., a sulfonic acid deriv. Processes (2) and (3) yield mixed phenol-oil and phenol-methylene resins. Molding mixts., readily workable and remoldable, are obtained by incorporating filler." From C.A.

Bakelite Corporation

IMPROVEMENTS IN OR RELATING TO MOULDABLE COMPOSITIONS

Brit. 359,986 (Nov. 2, 1931); C.A. 27, 435 (1933).

"PhCH 100, tung oil 150 and H_3PO_4 1 part refluxed for 6 hrs., 100 parts of 40% CH_2O soln., 50 parts of colophony and 3 parts of aq. NH_3 are added and refluxing is continued for 5 hrs., the mixt. is then evapd. until anhyd. and is heated at 150° until a product is obtained which is clear and non-tacky at room temp." From C.A.

British Thomson-Houston Co. (from General Electric Co.)

IMPROVEMENTS RELATING TO THE INSULATION OF ELECTRIC CONDENSERS.

Brit. 15,770 (1905) (June 14, 1906)

This patent applies to a process of insulating electrical conductors with Chinese or Japanese wood oil and to the insulated products produced by it.

British Thomson-Houston Co. (from General Electric Co.)

MOULDED COMPOSITIONS FOR ELECTRICAL INSULATION AND THE PROCESS OF MAKING THE SAME.

Brit. 24,419 (Dec. 21, 1914)*; J. Soc. Chem. Ind. 34, 1212 (1915)

"China wood oil is thickened by heating, then mixed with a mineral filler, eg. asbestos, and ground marble, kneaded,

disintegrated, moulded and baked at 180-200° to polymerize the oil." From J. Soc. Chem. Ind.

Feagin, R.C. (to Austenal Lab.)

THERMOPLASTIC COMPOSITION SUITABLE FOR PRECISION CASTING.

U.S. 2,439,207 (Apr. 6, 1948); C.A. 42, 4399 (1948).

"A thermoplastic compn. is prepd. by adding a polymerized vegetable oil to molten wax. The polymerized vegetable-oil ingredient may be, for example, the polymerization product of cashew-nutshell oil, linseed oil, oiticica oil, tung oil, china-wood oil, or similar drying oils. Any of the known waxes are suitable such as amorphous wax, candelilla wax, carnauba wax, beeswax, palm wax, bayberry wax, curicoury wax, or ceresin wax. These waxes may be employed singly or in combinations. The wax ingredient is usually present in an amt. equal to approx. 50 to 90%, by wt., of the compn. The thermoplastic mixt. is moldable, form-retaining, and adapted to be invested in refractory mold material and completely eliminated therefrom by the application of heat. Various thermosetting and thermoplastic resins may be added to reduce shrinkage and enhance adhesiveness. The material is particularly valuable for casting procedures employed in making dentures, jewelry articles, and similar items of detailed and irregular contour." From C.A.

Gerhart, H.L. (to Pittsburgh Plate Glass Co.)

VULCANIZED COPOLYMERS OF DRYING OILS AND DIENE HYDROCARBONS.

U.S. 2,475,664 (July 12, 1949); C.A. 43, 7754 (1949)

"Drying oils such as linseed, tung, or soybean are caused to react with cyclopentadiene to form products which are useful as binders for fillers, such as asbestos, the combinations being suitable as friction elements in brake linings and clutches. Although methods for carrying out the copolymerizations have been previously described, this disclosure improves the quality of the binder by incorporation of S as a vulcanizing agent; this overcomes the slow hardening of the fabricated friction elements which had previously given soft-centers for long periods of time. Additionally, small amts. of pentaerythritol esters of linseed oil fatty acids are used in the binder *** From C.A.

Harvel Corp. (Harvey, M.T.)

INSULATING AND OTHER COMPOSITIONS FROM CASHEW NUT SHELL LIQUID.

Brit. 300,654 (Nov. 17, 1927)*; C.A. 23, 3998 (1929); Paint Varnish Production Mgr. P. 18 (Apr. 1929)

"Various products such as coating and impregnating materials, insulating materials, moulding compounds, resin-like materials, etc., are made from cashew nut shell liquid. To produce a drying product the liquid may be heated (1) alone, or (2) in the presence of metals or metal compounds, such as Cu, Pb, Mn, Pb oxide, CuO_3 , Cu oleate, cuprous ammonium carbonate, etc., or (3) in the presence of air which is blown through it.

The liquid may also be treated with aldehydes such as HCHO or furfural. Oils such as linseed, china-wood, japan wood, fish oil, etc., may be incorporated before or after or at any stage of the heating process to vary the product. Other materials such as pitch, particularly animal pitch, gums, ester gums, waxes, rosins, coumarone, copal may also be added in like manner. Accelerated drying properties may be obtained by the incorporation of driers such as litharge, MnO_2 and HCl, Mn resinate, Cu or Cu oleate, CuCO_3 , copper ammonium hydroxide or other Cu compounds. Varnishes are obtained with the aid of a solvent such as gasoline, kerosene, or the material sold under the registered trade mark "Varnoline." The reactions may be effected under pressure if desired. A copending application is referred to but no number is given. From Paint Varnish Production Mgr.

Kronstein, Abraham

PROCESS OF MAKING ANY DESIRED MATERIAL RESISTANT TO HIGH DEGREES OF TEMPERATURE AND TO THE INFLUENCE OF CHEMICAL AGENTS. Ger. 170,788 (Jan. 4, 1901)

This process for making any desired object or material stable in regard to change of shape at high temperatures consists in impregnating the object with wood oil or similar organic substances that polymerizes to a solid form on heating. The impregnated object is baked at a temperature above 100°C .

Kronstein, Abraham.

PROCESS FOR RENDERING MATERIALS PROOF AGAINST THE ACTION OF MOISTURE AND OF CHEMICAL AGENTS. Brit. 2679 (1901) (March 23, 1901); J. Soc. Chem. Ind. 20, 460 (1901)

The material to be treated is saturated with "wood oil," or "its mixtures with other oils, solvents, or resins," "capable of polymerisation," and is heated for several hours to 200°C . in a suitable oven. If the heating is effected in air, the material becomes dark red, but when air is excluded, it retains nearly its original colour. A great number of applications of the invention are described, such as impregnating ropes, nets, and the like; wood pulp, cardboard, paper, asbestos, cork, and objects required in electrical industries that require to be made proof against moisture. Vessels made from gypsum, cement, or like porous material may, it is stated, be thus rendered acid-proof, and available for chemical purposes. It is also stated that it is thus possible "to manufacture vessels for uses in chemical factories from cellulose or from wood pulp, which will resist the action of acids, such as hydrofluoric acid, and of sulphuric acid of 40 per cent strength, of dilute alkalis, and of solvents, such as alcohol, benzene, oil of turpentine, even at an elevated temperature." From J. Soc. Chem. Ind.

Kronstein, Abraham

PROCESS OF HARDENING AND SOLIDIFYING OILS AND UNSATURATED ORGANIC COMPOUNDS.

U.S. 826,860, (July 24, 1906); C.A. 1, 120, (1907)

"A process of producing solid, insoluble bodies from fluid organic oil-like, unsaturated, ester-like substances, non-solidifiable by heat, like linseed oil, which consists of adding to such substances an excess of fluid substances of the same class solidifiable by heat, such as wood oil, and heating the mixture and continuing the heat until the entire mass has solidified, and then cooling the mass." From C.A.

Kronstein, Abraham

"PROCESS FOR RENDERING MATERIAL OF ANY KIND PROOF AGAINST THE ACTION OF MOISTURE AND OF CHEMICAL AGENTS."

U.S. 919,031 (April 20, 1909); C.A. 3, 1804 (1909)

"Waterproofing. Porous materials, such as vessels of clay, wood pulp, etc., are impregnated with a mixture of tung oil and styrole or cyclopentadiene and heated to convert the mixture into solid polymeric form." From C.A.

Linzell, H.K. (to United States Gypsum Co.)

PROCESS OF MAKING PRESSED BOARD PRODUCTS.

U.S. 2,215,244 (Sept. 17, 1940); C.A. 35, 874 (1941)

"A process of consolidating ligneous cellulosic material into a dense, compact, coherent, board or slab comprises mixing such material with a drying oil, forming the material into a coherent but pervious mat, removing the moisture from said mat and oxidizing the drying oil to a sufficient extent to cause it to become dry, and thereafter pressing the resultant mat at a pressure of from 500 to 3000 lb. per sq. in. at a temp. of at least 350°F. but short of a temp. high enough to cause development of carbon." From C.A.

"The oils used may be of any suitable origin and preferably comprise such oils as linseed oil, perilla oil, China-wood or tung oil, soya bean oil, fish oils, menhaden oil, oil of Java olives and other oils which have the property of hardening by drying, usually with the formation of what is technically known as linoxyn." From the patent.

McKinney, R.S. (to United States of America.)

ADHESIVES.

U.S. 2,104,491 (Jan. 4, 1938); C.A. 32, 1856 (1938)

" α -Elcostearic acid may be used with materials such as those applied to vegetable growths." From C.A.

Madison, R.E., and Saunders, A.T. (to Truscon Laboratories, Inc.)

COLORING TREATMENT OF CONCRETE.

U.S. 2,220,341 (Nov. 5, 1940); C.A. 35, 1652 (1941)

"A liquid compn. for the color treatment of cement floors, etc., through scrubbing the compn. into the surface comprises a dispersion of a drying oil and resin vehicle such as 200-600 lb. China wood oil, linseed oil or perilla oil with 100 lb. of an oil-sol. resin and about 800 lb. of a petroleum distillate thinner, together with a finely ground pigment material and a soln. of dyes in coal-tar solvents." From C.A.

Masonite Corp. (Trigg, W.W.)

MANUFACTURE OF FIBRE BOARDS AND LIKE PRODUCTS.

Brit. 426,817 (Nov. 4, 1933); Brit. Chem. Abs. 1935, B. 541

"Hard fibrous board, which has been dried under pressure after formation on the machine, is impregnated with 4% of tung oil (T) (or other drying agent) and about 2% of a hydrocarbon waterproofing agent (W). It is then baked at 93° in presence of air for 7 hr. Alternatively T and W may be added either directly to the slush pulp (S) or partly to S and partly to the dried board." From Brit. Chem. Abs.

Nagel, F.J. (to Westinghouse Electric Corp.)

PHENOL-AMINE-FORMALDEHYDE RESIN

U.S. 2,482,498 (Sept. 20, 1949)

Straight phenolic resins do not give laminates suitable for punching unless oils such as tung oil are also incorporated. This invention pertains to resins containing amines which are equivalent to tung-oil modified phenolic resins for this use.

Nanfaldt, Wm. (to World Bestos Corp.)

HEAT DERIVATIVE OF CHINA WOOD OIL

U.S. 1,998,768 (April 23, 1935); C.A. 29, 3754 (1935)

"For obtaining a product which may be used in brake linings, etc., by heating the oil in closed containers to a temp. above 315° at a rate of about 22° per min., first condensing the vapor arising from the heated oil and returning the condensed vapor to the oil, then permanently sepg. a minor fraction of the distillate when the temp. of the oil is above 315°, and finally cooling the heated oil. App. is described." From C.A.

Oakes, E.T. (to National Biscuit Company)

CASEIN-TUNG-OIL PRODUCT AND METHOD OF PRODUCING THE SAME.

U.S. 1,380,494 (June 7, 1921) C.A. 15, 3372 (1921)

"Gelatinized tung oil is mixed with a solidified casein prepn. such as one formed with CH₂O and casein in order to form a mixt. suitable for making celluloid-like sheets or elec. insulating material. From C.A.

Pellerano, Silvio

SYNTHETIC RESIN COMPOSITIONS FOR MOLDING.

"U.S. 2,185,354 (Jan. 2, 1940); C.A. 34, 2963 (1940) "

"Compns. suitable for molding and hardening by heating are formed of an inert filler such as asbestos 500-800 parts together with 180-190 parts of a binder made up of an oil such as China wood and linseed oils 8-16, a coumarone-indene resin 16-30, a glycerolphthalate resin 4-8, stearin pitch 40-80, a solvent such as mixed naphthas 12-24 parts, and a small proportion of a plasticizer such as tritolyl phosphate." From C.A.

Scobel, Benjamin

SOLIDIFYING CHINA WOOD OIL.

U.S. 1,383,864 (July 5, 1921); C.A. 15, 3758 (1921)

"Chinawood oil is thoroughly mixed with FeCl_3 , ZnCl_2 , AlCl_3 or similar halides previously ground in rosin or linseed oil to form a moldable mixt. which is seasoned by gentle heating." From C.A.

Seebach, Fritz (to Bakelite Corp.)

PROCESS OF PREPARING MOLDED ARTICLES.

U.S. 2,091,164 (Aug. 24, 1937); C.A. 31, 7562 (1937).

"A hardenable phenolic condensation product is heated with tung oil in the presence of a mutual nonresinous solvent such as methyl cyclohexanol to effect homogenization of the materials, solvent is removed and the material is molded and hardened by heating. Several examples are given." From C.A.

Widmer, Gustav, and Fisch, Willi (to Ciba Products Corp.)

AMINOTRIAZINE-ALDEHYDE CONDENSATION PRODUCTS WITH LINOLENIC ACID MONOGLYCERIDE AND PROCESS OF MAKING SAME.

U.S. 2,448,338 (Aug. 31, 1948); C.A. 43, 441 (1949).

"Infusible, insol., light-stable, colorless, and H_2O -resistant condensation products (I) are obtained by the reaction of aminotriazines (II) with aldehydes (III). II is preferably 2,4,6-triamino-1,3,5-triazine (melamine) or similar compds., where NH_2 is substituted by OH, halogen, alkyl, aryl, or aralkyl groups or where the H of the NH_2 is substituted by NH_2 , alkyl, aryl, or aralkyl groups. III may be aliphatic, aromatic, or heterocyclic or in the form of paraformaldehyde (IV). The pH strongly influences the speed of reaction and the hydrophobic properties of I. The condensation is carried out in aq. soln., in an org. medium, or without solvent if IV is used. The org. medium may take part in the reaction, especially in the presence of compds. contg. alc. OH groups, e.g. mono- or polyhydric alcs. or alcs. with partly etherified or esterified OH groups, such as tristearate of pentaerythritol or partial glycerides of the fatty acids of China wood oil. II may be mixed with other compds. that react with HCHO , such as phenols, urea, or cyamide. Plasticizers, fillers, natural and synthetic resins are possible modifiers. I is used for casting masses, in molded and laminated products, as wood adhesives, in the textile industry (for dressing, anticreasing, and matting) and in lacquers." From C.A.

XIV. IMPREGNANTS, ADHESIVES

Bakelite Corp. (Groff, F.)

IMPROVEMENTS IN OR RELATING TO COMPOSITIONS OF MATTER HAVING ARC RESISTANT PROPERTIES.

Brit. 354,166 (July 29, 1931); C.A. 26, 3943 (1932)

"A compn. suitable for use with cotton, asbestos, etc., for production of products such as baked insulation is prepd. by condensing together a fatty oil such as tung oil and a phenol by heating with a promoter such as H_3PO_4 and continuing the heating to eliminate free phenol and produce a resinoid having arc-resisting properties. $(CH_2)_6N_4$ or the like may be added, as may also rosin, cellulose acetate, stearic acid and various other auxiliary ingredients." From C.A.

Boehm, R.M. (to Masonite Corp.)

HARD VEGETABLE FIBER PRODUCT OF HIGH STRENGTH AND PROCESS OF MAKING SAME.

U.S. 1,941,536 (Jan. 2, 1934); C.A. 28, 1864 (1934)

"A moist mass of vegetable fiber having a sufficiently large non-cellulose content to bond the fibers together is subjected to consolidating pressure and heat until dry. The product, together with a drying oil in quantity less than half that necessary to saturate the mass after consolidation, is subjected to highly heated air for a sufficient time greatly to increase the modulus of rupture of the material." From C.A.

Tung oil is the drying oil used in all examples and is named in 4 of the 9 claims. Two of these claims specify about 4% of tung oil. To it may be added about 5% (oil basis) of cottonseed oil to reduce the thickening tendency and petrolatum or other hydrocarbon material (about 1.5%, based on dry fiber) for waterproofing. The oil-petrolatum binder may be added to the fiber either before or after the pulp is pressed into a board.

Bergstrom, H.O.V., Heijmer, G.B., and Trobeck, K.G.

PROCESS OF INDURATING BOARDS OF FIBROUS MATERIALS.

U.S. 2,437,931 (Mar. 16, 1948); C.A. 42, 5226 (1948)

Hardened fiberboards have been made by impregnating a fibrous sheet by immersing it for 5 min. in a bath of tung or other drying oils at 50-100°C., wiping and baking the impregnated sheet for 15-24 hrs. at 130-150°C. This oil-hardening treatment lowers the water absorption of the board and imparts a higher mechanical strength to it. This patent relates to the use of certain tall oil fractions for this purpose.

Diesser, G.G.

NEW SUBSTANCES FOR VARNISHES, IMPREGNATING AND INSULATING MATERIALS AND PROCESS FOR THEIR MANUFACTURE.

Fr. 393,948 (Nov. 12, 1908)

Varnishes and impregnating and insulating substances as

prepared by the reaction of fatty acids, resin acids or their derivatives (e.g. linseed oil or wood oil) on carbohydrates (e.g. starch, cellulose, oxycellulose) or on amino compounds (e.g. amino acids, albumen). The specifications for the reactions with carbohydrates resemble those of U.S. 981,178 (1911) and Brit. 11,166 (1909); those for reactions with amino compounds are similar to U.S. 967,737 (1910) and Brit. 16,737 (1908).

Diesser G.G.

NEW SUBSTANCES TO BE USED AS VARNISHES AND FOR IMPREGNATION AND INSULATION AND A METHOD FOR THEIR PRODUCTION.

Brit. 11,166 (1908) (July 29, 1909); C.A. 3, 3013 (1909).

"Process of mfg. substances suitable for use as varnishes and for impregnation, consisting in reacting at sufficiently elevated temps., with or without pressure, with fatty acids or their compounds on cellulose or the like or mixts. of carbohydrates and amino acids or substances containing them, especially albuminous and albuminoid substances." From C.A.

"Example: 5 parts of cellulose (oxycellulose, hydro-cellulose) with 15 parts of linseed oil, wood-oil, castor oil or other fatty oil (or the fatty acids corresponding to the fatty oils) are heated during 2-4 hours at a temperature, at which chemical reaction of the reacting substances takes place, i.e., 280-350°C. --- The product of the reaction consists of a dark mass, which can be dissolved in benzol and other solvents." From the patent.

Diesser, G.G.

MAKING A BASE FOR VARNISH, WOOD IMPREGNATION OR INSULATING U.S. 967,737 (Aug. 16, 1910); C.A. 4, 3015 (1910)

"Making a base for varnish, wood impregnation or insulating by causing a fatty acid or oil, as linseed, castor or wood oil, to react upon keratin, spongin, fibroin, casein or albumin at a temp. (above 300°) exceeding the limit of decomp. of the reacting substances." From C.A.

Diesser, G.G.

SUBSTANCES TO BE USED AS VARNISHES AND FOR IMPREGNATION AND INSULATION AND METHOD FOR THEIR PRODUCTION.

U.S. 981,178 (Jan. 10, 1911); C.A. 5, 1199 (1911)

"Making varnish and insulation material by causing fatty acids, as those of linseed oil or wood oil, to react upon cellulose, oxy- or hydro-cellulose or starch, under pressure at a temp. of 280-320°, the volatile products of the reaction being allowed to escape." From C.A.

Diesser, G.G.

NEW SUBSTANCES TO BE USED AS VARNISHES AND FOR IMPREGNATION AND INSULATION AND METHOD FOR THEIR PRODUCTION.

Brit. 16,737 (1908) (July 15, 1909);* C.A. 4, 122 (1910)

"Mfg. substances intended to be used as varnishes or as materials for impregnation and insulation, by causing reactions to take place, at a temp. sufficient to cause chem. reaction of the reacting substances, between fatty acids or their compounds (as oils) or substances containing fatty acids or their compounds, and amino acids (such as glycerol) [sic] or their compounds, substances containing amino acids or their compounds (in particular albuminous and albuminoid substances)." From the C.A.

"Example: About 15 parts in weight of keratin or of substances containing keratin are heated during 3-6 hours at a temperature, of which chemical reaction between the reacting substances takes place, e.g. 300-350°C. with about one hundred parts by weight of raw or boiled linseed oil or the fatty acids of linseed oil (or wood-oil, or the fatty acids of wood oil, or other fatty oils and their fatty acids). -- The product of the reaction consists of a dark sticky mass which can be dissolved in benzol and other solvents!"-- From the patent.

Dusenbury, M.R. (to Hercules Powder Co.)

LIGNEOUS RESINOUS COMPOSITION AND METHOD OF PRODUCING
U.S. 2,410,205 (Oct. 29, 1946); C.A. 41, 4002 (1947)

"The compn. is formed by heating a ligneous wood, water, and a higher fatty acid contg. a conjugated system of double bonds or its ester at 240-330° until the cellular structure of the wood has disappeared and recovering the resin by removing the water. Thus 66 parts of tung oil fatty acids (I) was dissolved in enough acetone (II) to cover 154 parts of spent pine wood chips from which the turpentine, rosins, and oils had been extd. The II was distd. off, the impregnated chips were placed in an autoclave, covered with 550 parts of distd. water and heated at 260-70° for 1 hr. Removal of the water gave 143 parts of resin. Instead of I, citicica oil acids may be used. Any ligneous material as the woods derived from maple, birch, basswood or bagasse fiber and peat moss are applicable. The resins are characterized by freedom from cellular material and by a relatively dark color: they are sol. in acetone, cellosolve, carbitol: partly sol. in benzene or toluene, and insol. in gasoline hydrocarbons. They have a dry mp. above 50° and may be as high 200°. They may be used in molding compns. and plastics, as a dry core binder, in core oils and core-oil emulsions, in asphalt emulsions, as a binding material for fiber building board, in dense pressed boards, and in bonding insulation boards." From C.A.

Geer, W.C. (to B.F. Goodrich Co.)

IMPREGNATING COMPOSITION AND METHOD OF PREPARING AND USING THE SAME.

U.S. 1,773,101 (Aug. 19, 1930); C.A. 24, 5172 (1930)

"Chlorinated rubber and a vulcanizable drying oil such as linseed or tung oil are dissolved in a volatile solvent, such as C₆H₆, and S chloride is added to the soln." From C.A.

I.G. Farbenindustrie, A.G.

PROCESS FOR THE MANUFACTURE OF TECHNICALLY VALUABLE COMPOUNDS FROM OXIDATION PRODUCTS OF DRYING OILS.

Brit. 402,759 (Dec. 6, 1933); C.A. 28, 3254 (1934)

"Sulfite compds. of oxidized drying oils are made by treating blown oils or oryins with H_2SO_3 or its salts. The oxyins prep'd. from linseed, perilla, soy-bean or tung oil by the process of Brit. 238,200 (C.A. 20,1913), and suspended in H_2O and agitated with SO_2 , the resulting foaming mass is heated to remove excess SO_2 whereupon the sulfite comp'd. is ppt'd. and rendered H_2O -sol. by treating with an alkali base or NH_3 . H_2O -sol. compds. may be made directly by replacing H_2SO_3 with an aq soln. of $NaHSO_3$. Aq. solns. of such compds. may be used in the manuf. of adhesives or paints and, on evapn., yield films which may be hardened and rendered insol. by heating to 100° or by treating with O or H_2O_2 . The H_2O -sol. compds. may be treated with alk. earth or heavy-metal salts, e.g., $BaCl_2$, $FeCl_3$, $Pb(OAc)_2$, to form resinous substances which may be used as varnish ingredients." From C.A.

Kelley, J.W.

COMPOSITION OF MATTER.

U.S. 1,003,139 (Sept. 12, 1911); C.A. 5, 3884 (1911)

"Core-oil for binding sand, etc., consisting of a mixt. of resin oil prepared by dissolving a resinous material, (e.g., rubber resin) in Harbin oil (the latter being made by mixing a hydrocarbon oil with $CaCl_2$ [$Ca(OCl)_2$?] and HCl) and Chinese or tung oil treated with burnt umber and mixed with Harbin oil." From C.A.

Kelly, T.D.

IMPROVED COMPOSITION

Brit. 21,943 (1913) (Nov. 18, 1913); C.A. 9, 849 (1915)

"A mucilage is formed by mixing a gummy resin, such as that from which turpentine is distd., with an equal quantity of a non-drying vegetable oil. An insulating and waterproofing comp. is produced by adding 10.3% of this mixt. to oils such as linseed or tung oil, to which glycerol has been added or from which glycerol can be obtained, and heating quickly to about $550^\circ F$. Fabric, paper, or like material is dipped in this comp. and dried at a temp. not exceeding $300^\circ F$. A glue is made by adding 2.3% of a mixt. of 3 parts of 2 cement such as portland, and 1 part of a metallic oxide." From C.A.

Meyer - Zimmerli, E.

PROCESS FOR MANUFACTURING A PLASTIC MASS SUITABLE AS AN INSULATING AND IMPREGNATING AGENT OR FIBROUS MATERIALS.

Ger. 188,546 (Oct. 10, 1905);

A plastic mass suitable as an insulting and impregnating agent for fibrous materials is prepared by blending China wood oil with a wax (paraffin, ozokerite, carnauba wax, etc.) at a temperature 20° above the m.p. of the wax. The paper, linen, or other fibrous material to be used is impregnated

with the melt and conditioned at 40° -80°. The wax-oil composition hardens and becomes infusible, not by polymerization but due to the formation of a new compound.

Stamberger, Paul

PROCESS FOR THE PRODUCTION OF SOLIDIFYING THICKENED AND SOLID MASSES FROM ESTERS OF UNSATURATED FATTY ACIDS.

U.S. 2,391,042 (Dec. 18, 1945); C.A. 40, 1050 (1946)

"Drying oils or other unsatd. fat-acid esters of polyhydric alcs. in aq. dispersion are oxidized with H₂O₂ in the presence of catalysts, such as Pb, Co, Zn, and Mn driers. The oil dispersions are stabilized with nonionic or cationic agents as described in U.S. 2,391,041 * * * .

Dry, solidified masses or sticky masses suitable as adhesives are obtained." From C.A.

In one example, a phenolic resin modified varnish was made by cooking 4 gallons of china-wood oil, 16 gallons of linseed oil and 100 lbs. of a paratertiary alkyl phenol-formaldehyde condensation product. Driers were added (0.3% Pb, .02% Co. and .05% Mn). For emulsifying, for every 100 parts of the varnish, 2 parts of a polyethyleneoxide condensation product with castor oil, 0.3 parts of a polyethyleneoxide condensation product with oleyl alcohol and 0.5 part of triethanolamine were dissolved in the varnish. There was used 50 parts of water containing 1 part cetyl dimethyl benzyl ammonium chloride and 0.2 part of alkyl dimethyl benzyl ammonium chloride. For oxidation 100 parts of the 67% dispersion were mixed with 16 parts of 30 vol. 5% hydrogen peroxide solution. After the reaction was completed and the water evaporated a solid, strong, elastic film remained.

Thauss, Alfred, Doser, Arnold, and Mauthe, Gustav (to I.G. Farbenindustrie A.-G.)

CONDENSATION PRODUCTS OBTAINABLE FROM UNSATURATED HIGHER FATTY ACIDS AND PHENOLS.

U.S. 1,779,345 (Oct. 21, 1930); C.A. 25, 224 (1931)

"China wood oil and phenol are caused to react in the presence of dil. H₂SO₄ and the reaction mass is treated with concd. H₂SO₄. A resinous product is obtained which in the form of its alkali metal salts is easily sol. in water, and suitable for treating textile materials." From C.A.

Sutherland, D.M.

IMPROVEMENTS IN WALL AND CEILING DECORATIONS IN HOLLOW RELIEF. Brit. 22,177 (1900) (Jan. 12, 1901)

A wall or ceiling decoration fabric is made by coating paper, asbestos or the like, with a vegetable oil, oxidizing or polymerizing the oil, and embossing the product between engraved rollers. Oils that may be used include linseed, cottonseed, castor and wood oils.

Okie, F.G. (to Minnesota Mining and Manufacturing Co.)

ABRASIVE ARTICLE AND METHOD OF MAKING THE SAME.

U.S. 1,759,168 (May 20, 1930); C.A. 24, 3621 (1930); Paint Varnish Production Mgr. 14 (Dec. 3, 1930)

"A stable waterproof abrasive article such as sandpaper is prep'd. by incorporating a grit of comminuted abrasive particles in a waterproof adhesive material and applying this mixt. to a suitable sheet. There is sufficient penetration to render it waterproof. Likewise a satisfactory bond is maintained under aqueous conditions. An auxiliary coating is also applied to the back of the sheet. An example of a satisfactory binder is given as having the following compn.: Chinawood oil 106, hardened rosin 24, linseed oil 20, drier 2 and thinner 48 lbs. For the auxillary coating a greater proportion of drier is desirable." From Paint Varnish Production Mgr.

Willis, S.L., and Woodford, W.H. (to Remington Arms Co.)

WATERPROOFING

U.S. 1,701,868 (Feb. 12, 1929); C.A. 23, 1507 (1929)

"The top wad and crimp are sealed and impregnated with a compn. contg. a polymerizable oil such as Chinese Wood oil and a drier comprising Mn resinate and Pb oxide." From C.A.

XV. INKS, TUNGATE DRIERS, PAINT REMOVERS

Abbott, J.H.

IMPROVEMENT IN THE MANUFACTURE OF BLACK AND COLORED INKS FOR PRINTING.

Fr. 728,439 (Apr. 12, 1932); C.A. 26, 5777 (1932)

"Mineral or vegetable oils or a mixt. thereof, in which bitumen, tar or asphalt and a varnish (prepd. by heating China wood oil and dried by a metallic salt) are melted, are used in making printing inks and colors." From C.A.

Bakelite Corp.

IMPROVEMENTS IN OR RELATING TO THE PREPARATION OF PRINTING INKS.

Brit. 408,688 (Apr. 16, 1934); C. A. 28, 6001 (1934).

"Printing ink comprises an oil (e.g., tung, soybean, perilla, etc.) an oil sol. phenolic resinous compn. * * * The vehicle is then mixed with pigment and a small amt. of drier consisting of $(\text{AcO})_2\text{Pb}$ and Mn borate. Tetrahydronaphthalene or similar hydrogenated ring compd. may be added to dil. the ink. The oil-resin mixt. can be replaced by a compn. prepd. by interaction of a phenol with a fatty oil and subsequent condensation with CH_2O , $(\text{CH}_2)_6\text{N}_4$ etc." From C.A.

Bruson, H.A., and Stein, Otto. (to Resinous Products & Chemical Co.)

SICCATIVE COMPOSITION.

U.S. 1,969,709 (Aug. 7, 1934); C.A. 28, 6327 (1934)

"The salts of multivalent metals or of heavy metals with acids having the formula: $\text{R}-\text{O}-\text{C}_n\text{H}_{2n}-\text{COOH}$, where "n" is a whole no. greater than 1, and where R is an alkyl group having more than 3 carbon atoms, or where R is a hydroaromatic radical or aralkyl group, are readily sol. in esters, ketones and hydrocarbons, and in vegetable, animal and mineral oils, and the high degree of soly. of these new salts in petroleum naphthas and the pale color and low viscosity of the resulting solns., as well as their compatibility with drying oils and semi-drying oils, together with the effectiveness of these salts as oxidation catalysts, make them useful as siccatives for autoxidizable coating compns. such as linseed oil, tung-oil, soy-bean oil, perilla oil, etc.; as well as oleo-resinous varnishes, oil-paints, oil-enamels, linoleum, baking japans and printing inks, which are made from drying oils; and certain synthetic resins that dry by oxidation such as "alkyd" resins and "Glyptals" which are obtained by heating polycarboxylic acids with polyhydric alcs. and drying oils or drying oil fatty acids. These new salts possess advantages over the resinates, linoleates, naphthenates, tungates, benzoates, borates and similar well-known siccatives in that they are very much paler in color, and have a very much greater solubility and stability in petroleum distillates or oleo-resinous varnishes on storage, particularly at low temps.

They also cause less after-yellowing in white paints or varnishes on prolonged aging than do the commonly used siccatives, and also show less tendency to form skins particularly in printing inks, when these are stored in cans open to the air. Numerous details and examples are given, including the propn. and use of such compds. as Co and Mn hexyloxybutyrate, β -heptyloxypropionate and Co, Mn and Pb salts of generally similar character." From C.A.

Englische Wallwaren-Manufaktur

PROCESS FOR PIGMENT COLOR PRINTING, DURABLE AND FAST TO HOT IRONING

Ger. 146,806 (July 19, 1902);

This process comprises the printing of fabrics with a composition of pigment, resin and wood oil, or wood oil acids. Wood oil is superior to linseed oil for this purpose because the products dry faster, are stable to hot ironing and do not show a penumbra due to migration of oil.

Gardner, H.A.

PAINT REMOVER

U.S. 1,067,600 (July 15, 1913); CA 7, 3037 (1913)

"Paint remover containing linseed or Chinese wood or other oils (polymerized by heating to 260-315°) 10%, C_6H_6 40%, acetone 20%, MeOH 20%, and castor oil 10%." From C.A.

Gardner, H.A.

FINISH REMOVER.

U.S. 1,079,698 (Nov. 25, 1913); C.A. 8, 432 (1914).

"Paint- and varnish-remover formed of polymerized linseed or Chinese wood oil 10, gelatinous mixt. of Chinese wood oil and wax 10, C_6H_6 40, acetone 20 and MeOH 20 parts." From C.A.

Gautsche, A.J.

PRINTING INK

U.S. 2,018,060 (Oct. 22, 1935); C.A. 30, 309 (1936).

A printing ink for lithographic use consists of an offset ink each lb. of which is mixed with about 0.5-2.0 oz. (according to the brilliancy desired) of a compn. formed from a hard, resin-like phenol-condensation product 4.5, China wood oil 4, and wool grease 4 parts.

Heinemann, A.C.

PROCESS FOR THE PRODUCTION OF WATER AND ABRASION-RESISTANT WOOD DYES

Ger. 524,289 (April 16, 1930); C.A. 25, 3854 (1931)

"Compns. for staining wood comprise inorg. mordants such as $CuSO_4$ or K_2CrO_4 added to an irreversible aq. casein emulsion contg. linseed oil, wood oil or the like. Mineral pigments and small quantities of acid dyes may be included in the compns.

The casein emulsion may be prepd. with the aid of NH_3 , water glass or Na_3PO_4 , but caustic alkali yields a revisible emulsion and must not be used. The stainings are stable to water and rubbing. An example is given." From C.A.

I.G. Farbenindustrie A.-G. (Meidert, F., and Schatz, H.)

PROCESS FOR THE PRODUCTION OF COMPLETELY HOMOGENEOUS DRIER EXTRACTS.

Ger. 576,939 (Feb. 23, 1929); C.A. 28, 351 (1934)

"A homogeneous drying ext. readily sol. in drying oils and volatile org. solvents is prepd. from heavy or alk. earth metal salts of naphthenic acids and fatty acid drying or semi-drying oils such as linseed, wood, soy-bean or poppy seed oils. The product is used in the paint and varnish industry. In an example, naphthenic acid is saponified with NaOH and the clear soln. treated with $\text{Co}_2(\text{SO}_4)_3$. The resulting ppt. is washed and mixed with linseed oil." From C.A.

I.G. Farbenindustrie A.-G.

PROCESS OF PRODUCING PERFECTLY HOMOGENEOUS SOLUTIONS OF DRYING AGENTS.

Brit. 339,865 (Dec. 18, 1930); C.A. 25, 2865 (1931)

Solns. of heavy metal or alk. earth naphthenates which are sol. in drying oils and org. solvents for use as driers, are made by dissolving the naphthenates in the fatty acids of drying or semi-drying oils such as linseed, wood, soy-bean or poppy oils. Examples are given of driers contg. Co and Mn.

Jänecke, Gebr., & Schneemann, Fr. Komm-Ges. auf Aktien

BRONZE PRINTING INK FOR LITHOGRAPHY

Ger. 604,019 (Jan. 12, 1932); C.A. 29, 947 (1935)

"A medium for bronze ink for lithographic printing comprises polymerized wood oil 10, linseed oil 5, wax 1 and turpentine oil 2 parts. Preferably, wood oil is polymerized by heating it to $240-280^\circ$, boiled linseed oil is added, and the mixt. is heated to 200° for 2-3 hrs. Carnauba wax or other wax of like m.p. is added to the cooled mixt; then turpentine oil is added. About 9 parts of the mixt. is then stirred with 16-18 parts of bronze." From C.A.

Mutersbaugh, G.H., Zucker, Milton, Heiser, H.D., and Shope, W.A. (to Glidden Co.)

NITROCELLULOSE LACQUER.

U.S. 1,856,653 (May 3, 1932); C.A. 26, 3686 (1932)

"A neutral metallic tungate such as that of Zn is used with a clear nitrocellulose lacquer, in order to produce a 'flat' finish." From C. A.

Oswald, F.G. (to John W. Masury & Son)

PIGMENT VEHICLE FOR PRINTING.

U.S. 2,111,802 (Mar. 22, 1938); C.A. 32, 3992 (1938)

"A non-volatile liquid vehicle for "cold color" printing

requiring the application of heat to convert it into a hardened condition may contain a heat-convertible varnish resin such as a phenol-aldehyde resin about 1177, rosin-glycerol ester about 1002, drying oils such as tung oil and linseed oil about 3109 and a metallic drier such as Pb and Co naphthenate driers about 178 dissolved in about 932 parts of chlorinated biphenyl b. 278-360°." From C.A.

Reihl, C.A., and Waters, A.H.

LIQUID FOR DISSOLVING COATINGS OF PAINT, VARNISH AND THE LIKE. Brit. 27,092 (1906) (Sept. 12, 1907); C.A. 2, 336 (1908)

"A liquid solvent for paint or varnish, composed of one or more vegetable fatty acids dissolved to a clear solution in a volatile solvent such as benzene, benzol, alcohol, acetone, or the like." From C.A.

"Any of the following vegetable fatty acids may be used, namely, the fatty acids of castor nut, walnut, cocoa nut, candle nut or beech nut oil, or those of linseed, rape seed, sunflower seed, grape seed, or of olive oil or wood oil." From the patent.

Rosenblum, S.G., and Rideal, S.

IMPROVEMENTS IN THE PRODUCTION OF CHEMICAL COMPOUNDS FROM A CERTAIN OIL OR OILS OR THE FATTY ACIDS OF SAME, AND THE EMPLOYMENT OF SUCH COMPOUNDS IN THE MANUFACTURE OF DRYING OILS, VARNISHES, ENAMELS, LACQUERS, ANTIFOULING COMPOSITIONS AND THE LIKE.

Brit. 16,147 (1897) (July 7, 1898); J. Soc. Chem. Ind. 17, 775 (1898)

"The lead and manganese salts of the acids contained in tung oil (prepared by any of the processes adopted in similar cases) are far superior as driers for linseed oil to the resinates or linoleates of the same metals, 0.7 per cent. of the tung oil driers giving the same or better results than 2.5 per cent. of the older materials. The best method of employing the "tungates" is to dissolve them in the linseed oil, and then to "atomise" the solution in a jet of ozone (ozonized air or oxygen) at a temperature of 54°C. The same products can also be dissolved in turpentine and used as (coloured or plain) spirit varnishes, or lacquers; the aluminium salt can be employed to render wood, &c. fireproof; and the mercury salt as the active ingredient in antifouling compositions. The present specification, however, refers chiefly to the tungates as driers in conjunction with ozonised oil; and the sole claim, therefore, is for dissolving the manganese or lead salts of tung oil or mixtures thereof in oil such as linseed oil, and atomising the solution in a jet of ozone..!" From J.Soc.Chem.Ind.

Rosenblum, S. G., and the Commercial Ozone Syndicate

IMPROVEMENTS IN THE PRODUCTION OF CHEMICAL COMPOUNDS FROM A CERTAIN OIL OR OILS, OR THE FATTY ACIDS OF SAID, AND THE EMPLOYMENT OF SUCH COMPOUNDS IN THE MANUFACTURE OF DRYING OILS, VARNISHES, ENAMELS, LACQUERS, ANTI-FOULING COMPOSITIONS AND THE LIKE.

Brit. 12,508 (1898) (Sept. 3, 1898); J. Soc. Chem. Ind. 17, 933 (1898)

"This is an amplification of Eng. Pat. 16,147, 1897 (this Journal, 1898, 775); the process for manufacturing the various substances being as previously described. The present claims are for the preparation of metallic compounds of tung oil; for the use of the lead or manganese salt as a drier and a coloured or plain varnish or lacquer; for the aluminum salt as a waterproofing material; and for the addition of the mercury or other poisonous salt to anti-fouling compositions." From J. Soc. Chem. Ind.

Wendt, G.L. (to Sun Chemical Corp.).

COATING COMPOSITION.

U.S. 2,453,769, Nov. 16, 1948. C.A. 44, 854 (1950).

"Quick-drying printing ink contains at least 20% of drying oil, such as tung oil or oiticica oil, or others which contain eleostearate and keto eleostearate groups. Drying caused by radiation controlled to at least 50%, is within wave-length band 2800-3500 A." From C.A.

Wendt, G.L. (to Sun Chemical Corp.)

COATING COMPOSITION.

U.S. 2,453,770 (Nov. 16, 1948); C.A. 44, 854 (1950)

Similar to U.S. 2,453,769 (by same inventor) except drying caused by radiation of wave length 2450-2600A, is used.

XVI. MISCELLANEOUS PATENTS

American Cyanamid Co. (Kienle, R.H., and Whitcomb, G.P.)

NON-IONIC SURFACE ACTIVE AGENT.

Brit. 621,104 (Apr. 5, 1949); C.A. 43, 6439 (1949)

"Polymeric (I) unsatd. or satd. fatty acids (obtained by prolonged heating of the monomer (II) and distg. off the unreacted II in vacuo) are esterified with 2 or more mols. of a polyalkylene glycol or oxide of the general formula $\text{HOC}_n\text{H}_{2n}(\text{C}_n\text{H}_{2n}\text{O})_m\text{C}_n\text{H}_{2n}\text{OH}$ and a mol. wt. exceeding 300 with H_2SO_4 as catalyst. Mixed I and II esters are prepared by treating the II acid with the above condensation product. Acids of soybean, linseed, castor and tung were used." From C.A.

Barrett, H.J., and Strain, D.E.

ESTERS

U.S. 2,160,532 (May 30, 1939); C.A. 33, 7604 (1939)

"Details are given of the prepn. of products such as soybean oil diglyceride methacrylate, soybean oil monoglyceride dimethacrylate, coconut oil diglyceride methacrylate, China-wood oil diglyceride methacrylate, soybean oil monoglyceride monomethacrylate and glycol laurate methacrylate. Such products may be used as coatings on steel, glass or other surfaces, suitable with addn. of a drier such as Co linoleate or in mixts. with resins, cellulose derivs., etc. Mention is made of the similar production of derivs. of α -ethylacrylic acid, α -propylacrylic acid, α -heptylacrylic acid, α -cyclohexylacrylic acid, and α -phenylacrylic acid." From C.A.

Barsky, George (to E.F. Drew & Co., Inc.)

METHOD OF PRODUCING MONO- AND DIGLYCERIDES OF FATTY ACIDS.

U.S. 2,509,413 (May 30, 1950)

Fatty oils are heated to at least 250° for 1-24 hrs. with a few percent of boric acid. This process is applicable to a variety of animal and vegetable oils. China wood or other oil that polymerizes readily may be subjected to this process but care must be taken to avoid excessive polymerization.

Bolley, D.S. (to National Lead Co.)

PRODUCTION AND PURIFICATION OF FATTY OILS.

U.S. 2,352,883 (July 4, 1944); C.A. 38, 5681 (1944)

"A treatment of fatty oils contg. satd. and unsatd. constituents is employed which involves cooling a soln. of the oil in a nonfreezing solvent such as acetone, to a temp. (suitably about -20 to -40°) at which the more satd. constituents are pptd., sepg. the pptd. materials, including pptd. impurities, and further cooling the soln. to a temp. (suitably about -68° in treating linseed oil) at which the major portion of the remaining more unsatd. constituents ppt. out of soln. Various examples and details are given." From C. A.

"Tung oil is extracted from the tung apple with acetone. A 10% solution of the oil is cooled to -65°C . At that temperature 96% of the tung oil has precipitated from the solution. After filtering and freeing from the retained solvent,

a very much lighter oil containing substantially no impurities is obtained than may be manufactured by pressing or extraction and distillation of the solvent." From the patent.

Bradley, T.F. (to American Cyanamid Co.)

SYNTHETIC DRYING OILS.

U.S. 2,378,827 (June 19, 1945); C.A. 39, 4501-2 (1945)

"Preparations of polyallyl alc. and polyallyl alc. esters of fatty acids are described. Drying rates, hardness, gelation time and H₂O resistance of the synthetic oils are compared with tung, oiticica, linseed, isomerized linseed and dehydrated castor oils. In general, the polyallyl alc. type oils compare favorably." From C.A.

Bruson, H.A. (to Resinous Products & Chemical Co.)

SYNTHETIC OILS.

U.S. 2,282,557 (May 12, 1942); C.A. 36, 6028 (1942)

"An esterified phenol having at least one acyloxy methyl group attached to the aromatic nucleus, such as 2,4,6-tri-(acetoxymethyl)phenyl acetate, is heated to a reaction temp. (which may be about 200-300°) with an ester of a poly unsatd. higher aliphatic carboxylic acid, such as methyl eleostearate or linseed oil or tung oil)." From C.A.

Bruson, H.A. (to Resinous Products & Chemical Co.)

ESTERS OF HYDROXYDIHYDRONORPOLYCYCLOPENTADINES AND UNSATURATED FATTY ACIDS.

U.S. 2,414,089 (Jan. 14, 1947); C.A. 41, 2444 (1947)

"A continuation-in-part of U.S. 2,395,452 (C.A. 40,3138).

The following esters were prepd: Hendecenoate (BF₃Et₂O catalyst), b₂ 185-90°; oleate (BF₃Et₂O catalyst), b₂ 240-50°; ester with mixed acids from linseed oil (BF₃-Et₂O catalyst), b₂ 245-50°; ester with mixed acids from linseed oil (BF₃Et₂O catalyst), b₂ 245-50°; octadecadienoate (H₂SO₄ catalyst), b₂ 235-50°; crotonate (C₁₀-H₇SO₃H and H₂SO₄ catalyst), b₃ 128-30°; 2,5-endomethylene-1,2,5,6-tetrahydro-6-methylbenzoate (H₂SO₄ catalyst); b₅₋₆ 188-95°; methacrylate (I) (di-β-naphthol and H₂SO₄ catalyst), b₈ 126-33°; acrylate (II) (di-β-naphthol and H₂SO₄ catalyst); b₃₋₅ 116-22°. The licanate, eleostearate, alupanodonate, and cinnamate esters were also prepd. I and II were prepd. by transesterification. These products are useful as components of paints, varnishes, and coating compds. since they form hard, tough films on exposure to air." From C.A.

Crooker, W.W.

IMPROVEMENTS IN THE ART OF FINISHING THE SURFACES OF THE HEELS, SOLES, AND OTHER PARTS OF BOOTS AND SHOES.
Brit. 727 (1908) (Sept. 10, 1908)

A process is described for finishing surfaces of boots and shoes by coating them with an emulsified wax and then applying a second coat which combines with the first coat on heating. The second coat is composed of a resin like callitris quadrivalvis (2-8 oz.) picea exelsa pitch (2-8 oz.) one or more vegetable oils, such as lucca and sassafras oils (2-6 oz. of each) and a vegetable balsam, known as gurjun, (1-4 oz.), alcohol, camphor and coloring matter. If the luster of the product is too high it can be reduced by rubbing with a composition of vegetable wax (12), stearic acid (1), ceresine (4), lard oil (2), and kerosine oil (10).

Downs, C.D., and Saunders, H.F.

PIGMENTS AND PROCESS OF MAKING THE SAME.

U.S. 2,386,885 (Oct. 16, 1945); C.A. 40, 477 (1946)

"Calcined TiO_2 to which is added 0.1% to 5% Zn resinate is pulverized in an air stream, sepd. and repulverized to reduce particle size and improve texture. The addn. agents which may be employed in the process are abietic acid and metal resins; Zn, Ca, and Mg resins; phenolic resins and phenolic resins modified with maleic, linoleic, linolenic, soy-bean acids, tung oil acids, etc." From C.A.

Ellis, Carleton

COMPOSITION OF MATTER

U.S. 760,185 (May 17, 1904).

Liquid compositions for the preservation of fabrics and leather (e.g. the coating of shoe soles) are composed of metallic palmitates (preferably of Zn and/or Al), a drying oil (e.g. linseed or Chinese wood oil), and (optionally) a thickener, such as gilsonite, kauri gum or gum amine.

Ellis, Carleton

COMPOSITION OF MATTER

U.S. 879,375 (Feb. 18, 1908)

A composition for cleaning and polishing paint and varnish surfaces is composed of a neutral sulfonated oil, water and a volatile hydrocarbon, such as turpentine, benzol or toluol. The oil may be cottonseed, corn, linseed, tung, rape, peanut, lard, palm, cocoanut, castor, red, fish, neatsfoot, olive, sesame, tallow or whale oil or greases, like stearin, olein, palmitin, wool fat, etc., or coal tar and derivatives like creosote, benzol, etc. A sulfonation procedure is described. There may be added also a thickener, like wax, a metallic soap, a carbohydrate, a protein or an inorganic filler.

Ellis, Carleton

SOAP FOR PAINT, VARNISH, ETC.

U.S. 1,000,966 (Aug. 15, 1911); C.A. 5, 3736 (1911).

"Composition for cleaning paint, varnish, etc., comprizing soap, H_2O , linseed oil and sulfonated oil, the amt. of linseed oil being sufficient to more than satisfy the alkali set free

by hydrolysis on dilution." From C.A.

Instead of linseed oil one may use Chinese wood oil, corn oil, cottonseed oil or the like.

Flint, R.B., and Salzberger, P.L. (to DuPont de Nemours E.I. & Co., Inc.)
SALT OF POLYHYDROXY AMINES WITH ORGANIC ACIDS, AND PROCESS FOR PREPARING SAME.

U.S. 1,994,467 (Mar. 19, 1935); C.A. 29, 3188 (1935)

"Single or mixed bases such as methylglucamine, methylxy-
lamine, butylxylamine, ethylglucamine, hydroxyethylglucamine,
methylgalactamine, methylfructamine, arabinamine, mannamine,
galactamine, butylglucamine, isobutylglucamine, laurylglu-
camine and dimethylfructamine (details of prepg. some of which
are given) are caused to react with acids such as oleic acid,
stearic acid, or other acids such as lauric, behenic, hydro-
oxystearic, coconut oil acids, elaidic, erucic, brassidic,
eleostearic, China wood oil acids, stearolic, linoleic, linole-
nic, linseed oil acids, behenolic, ricinoleic, castor oil
acids, sulfated higher alcs. such as lauryl and stearyl sul-
fate, sulfonated fish oil, sulfonated mineral oils, alkyl
naphthalenesulfonic acids, sulfonated oxidized mineral oils,
the so-called mahogany sulfonic acids, sulfonated abietenes,
hydroxy sulfonic acids, abietic acid, resins of high acid no.
such as glyptals, acid phthalic esters of fat acid glycerides,
etc., to form salts which may be used as detergents, emul-
sifying agents for insecticides, polishing and waterproofing
compos., in cosmetics, shaving creams, shampoos, in the prepn.
of sol. mineral oils, in textile lubrication, etc." From C.A.

Freeman, S.E. (to Pittsburgh Plate Glass Co.)

FRACTIONATION OF FREE FATTY ACIDS

U.S. 2,278,309 (Mar. 31, 1942); C.A. 36, 5041-2 (1942)

"A relatively active fraction is extd. from a mixt. of such
free fat acids with less-active fat acid. A two-phase solvent
system is used which comprises a relatively nonpolar hydro-
carbon solvent such as isooctane and an active polar solvent
immiscible therewith, such as furfural, the immiscible solvents
are sepd. and they are eliminated from the fat acids dissolved
in them. An arrangement of app. is described." From C.A.

The process is applicable to tung oil acids.

Gardner, H.A.

PROCESS OF MODIFYING THE CHARACTERISTICS OF PIGMENTS, AND PRODUCT.

U.S. 1,894,168 (Jan. 10, 1933); C.A. 27, 2590 (1933)

"The surfaces of pigment particles such as those of a Ti-
contg. pigment are coated with a film comprising β -eleostearin,
which serves to produce a highly waterproof material." From
C.A.

Greenlee, S.O. (to Devco Raynolds)

COMPOSITIONS OF PHENOL-OIL CONDENSATES AND POLYEPOXIDES.

U.S. 2,542,664 (Feb. 20, 1951); J. Am. Oil Chemists' Soc. 28, 227 (1951)

"China-wood oil (291), phenol (200) and 85% phosphoric acid are heated to 190-200° for four hours and the unreacted phenol is removed by vacuum distillation. About 3.3 moles of phenol combine with each mole of China-wood. Other oils such as oiticica and linseed may be used in place of China-wood oil. Glycerol and epichlorohydrin are condensed using boron trifluoride catalyst to give a product with about two epoxide groups per mole. About 10% of the above polyepoxide is added to the phenol-oil condensate, plus diethylene triamine catalyst. A film of this mixture spread from solution, bakes in 15 minutes at 150° to a hard tough flexible film." From J. Am. Oil Chemists' Soc.

Gruenwald, L.A.

SURFACE-ACTIVE MATERIALS.

U.S. 2,374,678 (May 1, 1945); C.A. 39, 3954 (1945)

"Morpholine forms complex compds., which are good surface-active materials, with oils or their constituent fat acids. Linseed, tung, or China wood oil is heated with 3 mols. of morpholine per mole of triglyceride in an autoclave at 135° for 10 hrs. The resultant complex is a good emulsifying and dispersing agent. On heating films or coatings of the material, morpholine is lost, and a coating of the original aliphatic material results." From C.A.

Jacobson, N.

NEW OR IMPROVED COMPOSITION FOR RESISTING SOLAR AND OTHER HEAT AND ARTICLES TREATED THEREWITH.

Brit. 3572 (1912) (Nov. 7, 1912); C.A. 7, 2690 (1913)

"A heat-resisting composition for coating helmets, etc., or the cloth used in making them, consists of asbestos, an adhesive such as gum dammar, tung oil, and Mn oleate, with or without additional substances, such as camphor. The coating may be treated with HCHO soln., and covered with cloth impregnated with shellac." From C.A.

Kelly, T.D.

IMPROVED COMPOSITION

Brit. 23,846 (1912) (Oct. 20, 1913); J. Soc. Chem. Ind. 32, 1120 (1913)

"Size or like gelatinous material (5 parts by volume) is mixed with fatty oils such as linseed or tungseed oil (3 1/2 parts) or with mineral oil to which glycerin has been added, and the mixture is heated with metallic (lead, zinc or iron) oxides (1/2 parts) and Portland or magnesium cement (2 parts) at a temperature not much above 212°F. (100°C.) for 15 minutes. Colouring or filling material may also be added." From J. Soc. Chem. Ind.

Kleinstaub, F.G.

METHOD OF DISSOLVING RESINS.

U.S. 654,646 (July 31, 1900).

This patent describes a process for the solution of resins, such as copals, which are normally difficult to dissolve. They can be dissolved in a combination of the usual resin solvent with a solution of dammar, tung oil, benzene, turpentine and (preferably) oil of rosemary. Heating to 40-50° with agitation is helpful. In an example, the following proportions were used: dammar (3), tung oil (50), turpentine (10), benzene (23), and oil of rosemary (2).

Kleinstaub, F.G.

COMPOUND FOR DISSOLVING RESINS.

U.S. 656,252 (Aug. 21, 1900).

This patent applies to the products made under U.S. Patent 654,646, (Kleinstaub) wherein hard resins, like copals, are dissolved with the aid of turpentine, benzene, tung oil, dammar and oil of rosemary.

Krumbhaar, William

COMPOSITION CONTAINING WOOD OIL OR OITICICA OIL.

U.S. 2,319,507 (May 18, 1943); C.A. 37, 6480 (1943)

"In coating surfaces, such as those of automobiles, with oil-contg. coatings of low viscosity which dry with the characteristics of wood oil or oiticica oil, but without their wrinkling tendencies, a method is employed which involves esterifying a nonwrinkling, gas-proof heat-treated monoglyceride of elcostearic acid or the mixed acids of wood or oiticica oil produced by heating at above 240° but below a temp. which would undesirably affect the monoglyceride in the absence of esterifying components, with a nongelatinizing org. carboxylic acid, such as linseed oil fatty acids, or other drying oil monobasic fatty acid or aliphatic or aromatic polybasic org. carboxylic acid." From C.A.

Lansing, A.C. (to Commercial Solvents Corp.)

SOLVENT EXTRACTION OF TUNG OIL

U.S. 2,320,970 (June 1, 1943); * C.A. 37, 6915 (1943)

"Tung-nut meats are extd. with a solvent mixt. contg. a lower aliphatic ketone, such as acetone, together with a smaller proportion (suitably about an azeotropic proportion) of a lower aliphatic alc., such as MeOH, and the solvent is sepd. from the resulting ext. by distn., at least the final portion of the distn. being effected under vacuum." From C.A.

McKinney, R.S.

ALKALOID COMPOUND.

U.S. 2,139,839 (Dec. 13, 1938); C.A. 33, 2285 (1939)

"Fatty acids derived from drying oils such as tung, linseed, fish or soybean oil, by reaction with alkaloids such as nicotine, quinine or strychnine (suitably in a common solvent such as EtOH), form water-insol. compds., the nicotine compds. being suitable for insecticidal use, the strychnine compds. for poisoning predatory animals or as a medicine, and the quinine compds. for use as the free alkaloid, especially for use in antisunburn ointments." From C.A.

Mantle Lamp Company of America (Whipple, A.D.)

IMPROVED PROCESS FOR INHIBITING THE FORMATION OF UNDESIRABLE COLOUR IN ANIMAL OR VEGETABLE OILS OR FATS AND THE OILS OF FATS PRODUCED THEREBY.

Brit. 410,834 (May 18, 1934); C.A. 28, 7050 (1934)

"Divided on Brit. 410,837 (C.A. 28, 6582). Discoloration of animal or vegetable oils or fats on exposure to air and light is prevented by incorporating not more than 0.05% of colloidal Cu, Co, Cd, or Ag, or of carbonate of Co, Cu, Li, Mn, Cd, Ba, Bi, nitrate of Ca, Be, Li, acetate of Na, Cu, Mn, hydroxide of Co, Be, Cu, Th or of a mixt. of CoCO_3 and CuCO_3 with or without Bi sub-carbonate. Lard, cottonseed, China wood and linseed oils are specified for treatment." From C.A.

Meyer, E.E.A.G.

PROCESS OF RECOVERING RUBBER WASTE.

U. S. 986,931 (Mar. 14, 1911) C.A. 5, 2003 (1911)

"Recovering waste rubber by dissolving in heated Chinese wood oil, diluting the soln. with a solvent for rubber, drawing off the soln., and then sppg. the rubber from the soln. by pptn., e.g. by acetone." From C.A.

Oosterhof, Dirk, Vlodrop, Cornelis, van, and Waterman, H.I. (to Imperial Chemical Industries, Ltd.)

PROCESS FOR REMOVING LOW MOLECULAR GLYCERIDES FROM POLYMERIZED OILS BY DISTILLATION.

U.S. 2,065,728 (Dec. 16, 1933); C.A. 31, 1235 (1937)

"To remove volatile matter including low-mol.-wt. glycerides from a polymerized drying oil such as polymerized linseed or China wood oil, it is exposed to evaporative distn. in a high vacuum, approx. of the order of the cathodic vacuum, at a temp. sufficiently high to vaporize and eliminate unpolymerized oil as well as free fatty acids. App. is described." From C.A.

Plank, C.J., and Socolofsky, J.F. (to Socony-Vacuum Oil Co.)

ALKYLATION OF PHENOL BY ALKYL HALIDES CATALYZED BY FINELY DIVIDED GELS OF CERTAIN DRYING OILS

U.S. 2,460,793 (Feb. 1, 1949); J.Am. Oil Chemists Soc. 26, 253 (1949)

"Equimolar portions of phenol and a tertiary alkyl halide are refluxed in the presence of a finely divided gel such as BF₃- bodied China wood oil gel, BF₃-bodied oiticica oil gel or heat bodied China wood oil gel." From J. Am Oil Chemists' Soc.

Radcliffe, John

IMPROVEMENTS IN COMPOSITIONS CONTAINING PITCH.

Brit. 4589 (1911) (Feb. 23, 1912).

This patent applies to the addition of an organic material such as ground wood, cellulose or peat and a high boiling oil (optional) to a pitch to give a soft, flexible, high melting product. "Linseed or other oil" is used in examples. The oil and other organic material may be added together in the form of oil-bearing seeds or the press cake from the crushing of "cottonseed, linseed, tung beans, soya beans and the like." The subject of this specification covers the major part of French Patent 440,461 (Radcliffe, 1912).

Radcliffe, John

IMPROVEMENT IN THE MANUFACTURE OF COMPOSITIONS CONTAINING PITCH AND OTHER SIMILAR MATERIALS.

Fr. 440,461 (May 4, 1912);

This French specification includes the material of British Patent 4,589 (1911) plus some additions. The addition of dusts formed in the milling of grain (mill sweepings) or of oil seed meals such as tung meal to asphalts or pitches yields compositions of high melting point which are useful as paving materials. An oil such as "green oil" may be included. Example: coke oven pitch (90-70), mill sweepings (10-30) and oil (7-14) (optional).

Repin, C.

ELASTIC GREASES FOR MECHANICAL PURPOSES.

Fr. 322,716 (Oct. 15, 1902);* J. Soc. Chem. Ind. 22, 372 (1903)

"About 40 percent of elaeococca (tung) oil is added to a fat or fats solid at the ordinary temperature." From J. Soc. Chem. Ind.

Root, F.B. (to Ellis-Foster Co.)

SOLUBILIZING GEL AND PROCESS OF MAKING SAME.

U.S. 2,271,804 (Feb. 3, 1942); C.A. 36, 3690 (1942)

"An insol. heat-gelled compn. such as one formed from tung oil and ester gum is solubilized by a mastication treatment, as by use of a Banbury mixer." From C.A.

Schmidding, W.

PREPARATION OF LACQUERS FROM TUNG OIL.

Brit. 282,574 (Feb. 28, 1927); Addn. to Brit. 247,599 Brit. Chem. Abs. (1928) B. 164.

"Lacquers are prepared in an installation of three vessels located one above the other and connected by pipes, tung oil being heated in the middle vessel and additional material being run in, at a suitable stage in the cooking of the tung oil, from the upper vessel (also provided with heating apparatus). The mixture is eventually run off into the lowest vessel, where cooling and thinning take place. The outlet closure of the middle vessel is located within the vessel to avoid trapping of gelatinised oil. The three vessels are connected to a common vapour exhaust." From Brit. Chem. Abs.

Sibley, R.L. (To Rubber Service Laboratories Co.)

PREPARATION OF COATING COMPOSITIONS.

U.S. 2,022,301 (Nov. 26, 1935); C.A. 30, 886 (1936)

"A dimethylhydroquinoline or other alkyl substituted hydroquinoline is employed in varnishes or the like contg. drying oils such as tung oil to control oxidation." From C.A.

Société de Chimie et Catalyse Industrielles

PROCESS FOR THE PRODUCTION OF RICH GASES BY MEANS OF PETROLEUM RESIDUES AND APPARATUS THEREFOR.

Brit. 140,128 (Mar. 25, 1920); C.A. 14, 2257 (1920)

"A gas for enriching blue gas or poor gas is obtained from petroleum residues, tar oils, shale oils, wood oils, fish oils, etc., by passing the vapors over catalysers such as Fe or Cu, heated to 500 to 600° and used in the form of filings or powder agglomerated into briquets. The oil from a tank is vaporized in a boiler integral with a retort containing the briquets supported on channel-irons for convenience of introduction and removal. The gases are passed through a condenser in which the light oils produced are condensed, while the fixed gases pass to generators to be mixed with the blue gas or poor gas." From C.A.

Talmdage, J.M.

ARTICLE-COATING PROCESS

U.S. 933,598 (Sept. 7, 1909); J. Soc. Chem. Ind. 29, 1050 (1909)

"The article is coated with a film of raw tung oil, alone or mixed with a hydrocarbon, and then heated to at least 212 degrees F. for not more than 30 minutes, whereby the oil is converted into an insoluble form, which is stated to be resistant to water, chemicals, fire, heat and electricity." From J. Soc. Chem. Ind.

Talmdage, J.M.

PROCESS FOR COATING MATERIALS

Fr. 406,666 (Dec. 13, 1909); J. Soc. Chem. Ind. 29, 502 (1910) (no abstract)

Substantially the same as U.S. 933,598 (Talmdage)

Talmadge, J.M.

ARTICLE COATING PROCESS

Brit. 19,696 (1909) (July 21, 1910)

A coating process for rendering articles resistant to water, chemicals, fire, heat and electricity consists in coating the article with tung oil or a solution of tung oil and then baking it at a minimum temperature of 212°F.

Varmalov, V.S.

TUNG-OIL SUBSTITUTES.

U.S.S.R. 67,921 (Feb. 28, 1947);* C.A. 43, 3632-3 (1949).

"Linseed or similar oil is polymerized to yield a product with an I no. 84-94. The polymerization product is sapon. by use of not over 30% of the alkali needed for complete sapon. The product of incomplete sapon. is salted out, decompd. with an acid, and the free acids driven off." From C.A.

Vivian, A.W.H.

IMPROVEMENTS IN OR RELATING TO THE MANUFACTURE OF ARTIFICIAL FUEL.

Brit. 7,357 A (1906) (March 27, 1907)

An artificial fuel is made by mixing and heating together coal dust, water, a magnesite cement, a thickened oil and, if desired, lime or chalk. Wood oil may be used to thicken the petroleum, creosote oil or other oil used.

Ward, J.P.

FILTERING VARNISHES OR OILS.

Brit. 208,880 (Nov. 22, 1922)*; C.A. 18, 1579 (1924)

"Varnishes or oils, such as China wood oil, linseed oil or other drying oils, liable to detrimental chemical or physical changes during filtration are filtered within certain limits of temp. and pressure; for China wood oil the temp. is about 60° and the pressure 30 to 50 lbs. per sq. in. The filtering app. is of the type in which the cloth is sepd. from the grooved supporting plate by wire gauze, etc. so as to prevent the cloth from being pressed into the grooves and so choking them. This promotes the rapid escape of the filtrate after it has passed through the cloth and so minimizes the time during which chemical and physical changes are likely to occur. A suitable construction is specified." From C.A.

Weigel, F.W. (to V.D. Anderson Co.)

METHOD OF EXPRESSING OIL.

U.S. 2,533,858 (Dec. 12, 1950).

A process is described for performing in a single unit all of the operations necessary for the extraction of oil from flaxseed, soybeans, tung fruit and other oilseeds. Before pressing tung nuts they are heated for 20-60 min. at 200°F. or lower to reduce the moisture content to 3%. In the conditioner the temperature is allowed to rise to 210°F., the optimum temperature for pressing tung nuts.

Zuehl, Dr., and Eisemann

PROCESS FOR THE MANUFACTURE OF A SUBSTITUTE FOR LANOLIN

Ger. 124,874 (June 19, 1900)

A salve-like mass useful as a substitute for lanolin is made by combining thickened Chinese wood oil (300), ordinary wood oil (700) and a wax (30).

SUPPLEMENT I

(o) Articles

Anonymous

SEEDS OF ALEURITES FORDII AND ALEURITES TRILOBA FROM HONG KONG.
Bull. Imp. Inst. 5, 134-5 (1907)

Oils were extracted from nuts of Aleurites fordii and A. triloba (A. moluccana) and their properties determined. The oil of A. fordii was compared with commercial Tung oil, "which appears to be prepared indiscriminately from the seeds of Aleurites cordata or Aleurites fordii or mixtures of the two", and with the oil of A. triloba giving the following results, resp.: d_{4}^{15} 0.9404, 0.9360, 0.9274; acid val. 2.89, ---, 1.72; sapon. val. 191.8, 155-211, 204.2; I val. (%) 166.7, 149-165.7, 139.7; Hehner val. (%) 94.6, 96.0-96.6, 96.4; titer test (°C) 42-42.5, 37.1-37.2, 17.8. The yield of oil of A. fordii amounted to 58.3% of the kernels and 36.4% of the entire nuts.

Anonymous

PLANT IMPORTATIONS.

Imperial Dept. of Agr. for the West Indies Report (Dominica) 1912/13, 3; 1913/14, 5; 1914/15, 3.

Brief notes state that attempts to introduce Aleurites fordii into Dominica have been unsuccessful. A. triloba was established.

Anonymous

FOR PRACTICAL STANDARD FOR CHINA WOOD OIL,
Oil, Paint Drug Reprtr. 81, 18, (Apr. 1, 1912)

Analytical tests useful in revealing adulteration are discussed with the aim of establishing standards for wood oil.

Anonymous

CHINA WOOD OIL TRADE.

Oil, Paint Drug Reprtr. 81, 37 (June 24, 1912)

A note which quotes from a report of Consul General R.S. Greene, Hankow, on the production, export statistics and prices of Chinese wood oil. Szechwan wood oil is preferred in Hankow because of its light color. G. believes that a modern crushing plant would not be successful in China but a suitable decorticating machine would be welcomed.

Anonymous

CULTIVATION OF CHINA WOOD OIL TREE IN THE UNITED STATES.
Oil, Paint Drug Reprtr. 82, 36-7 (Nov. 18, 1912)

A report of a lecture by David Fairchild on the progress made by the American tung industry.

Anonymous

NEW SOURCES OF WOOD OIL

Chamber of Commerce, J., 32 (226), 58 (1913) J. Soc. Chem. Ind. 32, 149 (1913)

"Wood oil is produced from the nuts of the "tungshu" tree (Aleurites fordii) of China, and at present practically the entire supply comes from that country. The normal price of this oil is 2s. 6d. [60 cents] per gallon, and in the fiscal year ended June 30, 1911, the United States imported about 5,000,000 gallons. The wood oil tree will grow along the Pacific coast, south of Sacramento, and in the Gulf States, possibly up into Georgia and South Carolina. As yet, however, there are no groves of these trees in the United States from which data as to the possibility of producing this oil in commercial quantities in that country can be obtained. Another possible source of supply is the kukui nut (Aleurites moluccana, or candlenut), which grows abundantly in Hawaii and the Philippines. These nuts yield an oil having the same properties and uses as wood oil, which was formerly exported in large quantities. If the nuts can be gathered and the oil extracted profitable, this oil should compete in the American market with Chinese wood oil." From J. Soc. Chem. Ind.

Anonymous

THE USES OF CHINA WOOD OIL.
British Trade Rev. 48, 68 (1917)

A brief note touching upon the production, value and uses of tung oil.

Anonymous

THE TUNG OIL (CHINESE WOOD-OIL) TREE. A POSSIBLE TREE CROP FOR THE SOUTHERN UNITED STATES.

U.S. Bur. Plant Industry, Office of For. Seed and Plant Introduction, Washington, D.C., 5 pp., (1917)

The tung oil tree, its culture and its economic possibilities in the southern U.S. are discussed.

Anonymous

NEW YORK PAINT CLUB HEARS TALK ON CHINA WOOD OIL SITUATION BY DR. TOCH.

Oil Paint Drug Reptr. 106 (22), 20 (Nov. 17, 1924)

A brief report of a lecture on the China wood oil industry. Production of tung oil in the U.S. is curtailing adulteration of the oil in China.

Anonymous

THE CHINESE WOOD-OIL TRADE.
Chem. Trade J. 75, 392 (1924).

Local Chinese names for tung oil, Hankow tung oil exporting firms and a brief description of Chinese tung oil extraction methods are given.

Anonymous

VARIETIES OF WOOD OIL.
Farbe u. Lack 1925 (16), 187*

Anonymous

DEPARTMENT OF COMMERCE EXECUTIVES FAVOR HOME GROWN WOOD OIL.
Paint, Oil Chem. Rev. 81 (12), 16 (Mar. 25, 1926)

A note on the progress in developing a domestic tung oil industry and on the advantages to be derived from having a dependable source of supply.

Anonymous

CHINA WOOD OIL TRADING RULES ARE PROPOSED BY IMPORTERS ORGANIZATION.

Oil, Paint Drug Repr. 111, (14), 21 (1927)

The Oriental Oils Association has tentatively adopted a set of regulations for governing transactions in chinawood oil between importers and between importers and consumers. These regulations are published in their entirety.

"The standard of quality for wood oil shall be:-- Pure chinawood oil, guaranteed to pass R.A. Worstall's or C.V. Bacon's own laboratory test for purity, at sellers option." From Rule 1, Section 1.

Anonymous

FIRST TUNG OIL CRUSHING PLANT STARTS OPERATION IN FLORIDA.
Am. Paint J. 13 (11), 10 (1928)

The first commercial extraction of tung oil in America was performed on Dec. 13 by the Alachua Tung Oil Corp.

Anonymous

WOOD OIL EXPERIMENTS IN NEW ZEALAND.
Oil & Colour Trades J. 74, 490 (1928)

It has been reported that 8000 acres of wood oil trees will be planted in Auckland Province.

Anonymous

TUNG OIL.
Nature (London) 124, 272-3 (1929)*; Biol. Abstracts 5, 210, Abs. No. 2136 (1931)

"A brief account of the production of the oil from the seed of Aleurites fordii and A. montana." From Biol. Abstracts.

Anonymous

ABRASIN OIL.
Peintures, pigments, vernis 6, 985 (1929)

A brief description of the source, properties and use in varnishes of abrasin oil. The author says abrasin oil is obtained from two varieties of trees apparently referring to Aleurites fordii and A. montana.

Anonymous

COLONIAL PRODUCTION OF TUNG OIL.

Crown Colonist 1 (1), 17-8 (Dec., 1931)

Cultural research on the production of tung oil from Aleurites fordii and A. montana has been started in Burma, Assam, Australia, New Zealand, and other British colonies.

Anonymous

ON THE CULTIVATION OF TUNG TREE.

Pub. by Bureau of Forestry, Hunan Province, China, 20 pp.
(1935) (in Chinese)*

Anonymous

SOYBEAN SITS PRETTY. BECOMES SO IMPORTANT THAT CHICAGO BOARD OF TRADE MAY ESTABLISH FUTURE TRADING.

Business week No. 362, 21-2 (Aug. 8, 1936)*; Hennefrund, H.H., and Colvin, E.M. (comp.) the Soybean Industry. (Agr. Econ. Bibliog. 74) U.S. Bur. Agr. Econ., Washington, D.C., 1938, P. 77.

"The uses for the soybean in industry, reasons for the increase in 1935 acreage, and competition of the oil with tung oil are mentioned."

Anonymous

NEW FIBER MADE FROM SOYBEAN PROTEIN TO BE USED IN AUTOS.

Sci. News Letter 33 (19), 302 (May 7, 1938) Hennefrund, H.H., and Colvin, E.M. (comp.) The Soybean Industry (Agr. Econ. Bibliog 74) U.S. Bur. Agr. Econ., Washington, D.C. 1938 p.118.

"***The blending of soybean and tung oil as a mixture for use in paints is briefly discussed."

Anonymous

TUNG PLANTATIONS.

Pampa Argentina 19 (215), 22-3 (July, 1945)*; Bibliog. of Agr. 7, No. 21,671(1945).

Anonymous

EXPRESSING TUNG OIL

Oil & Colour Trades J. 107 (2432), 809 (1945)*; Rev. intern. ind. agr. 7, 792 (1945)*; Oleagineux 1 (12), 230 (1946)

"Yields of oil as a function of temperature, of drying of the seeds, of the content of water and of the shell of the plant. Influence of the addition of various substances; interest in press cake,--problems in the utilization of old fruits; possibility of expression for a suitable mixture of fresh and of old seeds. Attempts of clarification of crude tung oil by chemical agents." Translated from Oleagineux.

Anonymous

YOUR LEAVES TELL THE T LE

Tung World 1 (1), 7 (1946)

Tung leaves of abnormal appearance are symptoms of mineral deficiencies.

Anonymous

GOOD TREES WILL INSURE BIG YIELD.

Tung World 1 (1), 6 (1946)

A review of the good qualities of selected strains (L-2, L-46, L-47, L-51, and F-99) of tung trees.

Anonymous

NEW WONDERS FOR TUNG OIL FOUND IN LAB

Tung World 1 (1), 9 (1946)

A brief report on an inspection trip through the U.S. Tung Oil Laboratory, Bogalusa, La.

Anonymous

THE WOOD OIL TRADE IN CHINA.

Oil & Fat Inds. J. 4, 348-52 (1947).

The annual Chinese exports of China wood oil for 1923-5 are tabulated. The inefficient marketing methods could be improved.

Anonymous

CHINESE GROWING, MILLING METHODS.

Tung World 2 (11), 14-8 (Mar., 1948)

The first of a series of articles containing excerpts from "Report of the China-United States Agricultural Mission, Report No. 2, May 1947" published by the Office of Foreign Agricultural Relations, U.S. Dept. of Agriculture.

Anonymous

SOYA-TUNG MIXTURES.

Oil & Colour Trades J. 113 (2573), 313 (1948)*; Oléagineux 3, 436 (1948)

Mixtures of soybean and tung oils have been bodied together and evaluated. A proportion of 60 soybean: 40 tung oil appears to be the best.

Anonymous

TUNG HARVESTER A SUCCESS.

Tung World 4 (5), 6-7 (1949)

A tung nut harvesting machine built by E.F. Shelton and F.N. Dodge has been successfully demonstrated.

"The machine itself consists of three separate units welded together into one operation. A small caterpillar tractor furnishes the propulsion power. Attached to the front of the tractor is the pick-up contrivance, consisting of closely spaced steel fingers revolving at 85 to 100 rpm's. The fingers throw the nuts into a drag elevator which in turn dumps them into a screen conveyer attached to the side of the tractor. As the nuts progress up the conveyer a powerful cleaning fan, operated from auxiliary power--an air-cooled 13 hp motor--blows out leaves, dirt and trash. Heavy dirt is eliminated by the screen conveyer." From the article.

Anonymous

DRYING OILS IN THE FRENCH UNION. THE FUTURE OF ALEURITES.
Oleagineux 4, 669-70 (1949)

A study of (1) present production, (2) possibilities of increasing production in the French Union and (3) markets.

Anonymous

SAMPLING, ANALYSIS STUDIED.
Tung World 4 (12), 6 (Apr., 1950)

A committee of growers from the Pearl River Chapter of the Tung Growers Council of America prepared an 8-point program for standardizing the sampling and analysis of tung fruit. The committee recommended: (1) a clean sample, (2) a mechanical sampler, (3) a sample of 10 lbs. per ton taken from truck and riffled down to 2 12-lb. samples for analysis, (4) samples to be taken by a licensed and bonded weighmaster, (5) all dirt and foreign matter to be weighed with tare of truck, (6) one sample for analysis for not more than one day's delivery of nuts or 15 tons, (7) use of the whole fruit method of analysis and (8) analytical work to be done by an independent, recognized referee chemist.

Acerete, A. [Acerete Lavilla, A.?]]

THE ALEURITES AND WOOD OIL

Spain, Cons. Super. de Invest. Cient. Estac. Expt. de Aula Dei.
Bull. 2, 84 p. (1949)*; Bibliog. of Agr. 14, 59,802, 66,891 (1950).

Agce, G.W.

DEVELOPMENTS IN TUNG FRUIT ANALYSIS.
Tung World 5 (2), 10, 16 (June 1950)

The development of the whole fruit method for the analysis of tung fruit is reviewed and compared with the component part method. Favorable reference is made to "Comparison of the Whole Fruit and Component Methods of Analysis of Tung Fruit" by Pack, Holmes and McKinney.

Aguilar, J.I.

TUNG TREE, OIL MATERIAL OF THE FUTURE FOR MEXICO.

Rancho Mex. 3 (22), 23-5 (Aug. 1947)*; Bibliog. of Agr. 11, No. 28,783 (1947).

Ahlers, N.H.E.

ABSORPTION SPECTROSCOPY IN PAINT RESEARCH. A SURVEY.

J. Oil & Colour Chemists' Assoc. 33, 421-51 (1950).

Absorption spectra were determined in the 200-35 mu region (ultraviolet) and in the 2.5-25u region (infrared) on several oils including Aleurites fordii (American and Chinese) and A. montana.

American Society for Testing Materials: Sub-committee III of Committee D-1.
TESTING OF PAINT VEHICLES. TESTS ON CHINESE WOOD OILS.
Drugs, Oils & Paints 30, 138-41, 211-3 (1914). C.A. 2, 247-8 (1915)

"Report of cooperative work on two samples of Chinese wood oil, one a commercial oil and the other one prepared from the nuts of Aleurites fordii. Average figures were, resp.: D₁₅.6, 0.9406, 0.9396; n₂₅, 1.5143, 1.5186; acid no., 3.45, 0.90; sapon. no., 192.3, 193.0; unsaponifiable, 0.56%, 0.47; I no. (Hübl, 18 hrs.), 169.3, 169.6. Widely varying results were obtained with the heating test and the I jelly test. Analysis of oils from nuts of trees grown in U.S. showed practically the same constants as the above oils. Anal. of a sample of oil from nuts of Aleurites moluccana (candle nut oil) gave: D₁₅ 0.9276, n₂₅ 1.479, acid no. 0.8, sapon. no. 188.2, I no. 151.6. Much additional information is given in the individual reports. By exposure to light the titer of the fatty acids of tung oil was raised from 41 to 61°. Flowed on PbO and exposed to the air tung oil showed a max. gain in weight of 9.1-10.6% in 8 days while linseed oil showed a max. gain of 13.7% in 3 days." From C.A.

Amsler, F.P.

TUNG DEVELOPMENT IN HARRISON COUNTY (MISSISSIPPI).
Tung World 2 (10), 24-5 29 (Feb. 1948); Bibliog. of Agr.
12, No. 30,884 (1948)

Andes, L.E.

THE DRYING AND PREPARATION OF CHINESE WOOD OIL.
Seife 6, 262-3, 315-6 (1921)*; Chem. Zentr. 1921, II, 910.
"General observations on the properties of wood oil.***"
The treatment of wood oil consists in a heating to 150-200°. Additions of rosin, hard resins, linseed oil and the like insure against undesired gelatinization. ***" Translated from Chem. Zentr.

Angelo, Ernest

THE BREEDING AND IMPROVEMENT OF TUNG.
Proc. Am. Tung Oil Assoc. 1940, 16-8
Nuts from individual trees of superior yielding and growth characteristics have been selected for use in a breeding program designed to produce improved varieties of tung trees.

Angelo, Ernest

PLANT A GOOD COVER CROP.
Tung World 1 (1) 10-1 (1946)
Tung orchards are improved by the growing, as cover crops, of Singletary peas, hairy vetch, Austrian peas, Melilotus indicata, sweet lupine, Southern bur-clover or Tifton bur-clover.

Angelo, Ernest, and Crane, H.L.

SOIL MANAGEMENT FOR TUNG ORCHARDS.
Proc. Am. Tung Oil Assoc. 1941, 3.

Angelo, Ernest, and Kilby, W.W.

BASIC SLAG, LIME AND PHOSPHORUS FOR WINTER COVER CROPS IN TUNG ORCHARDS.
Proc. Am. Tung Oil Assoc. 1942, 36-7

In most of the tung belt fertilizing with phosphorus and lime increase growth of cover crops. When available, basic slag is recommended for its effectiveness as a fertilizer and its low cost.

Aranda Gimenez, J.B.

TUNG CULTURE.

Pampa Argentina 19 (215), 23,31 (July, 1945)*; Bibliog. of Agr. 7, No. 21,643 (1945).

Argentina, Ministerio de Agricultura. Dirección de estadística
INVESTIGATIONS OF TUNG PLANTATIONS IN THE COUNTRY ON NOVEMBER 15, 1944.

Argentina, Sec. de Indús. y Com. Bull. 1 (9/10), 318-22 (June/July, 1945)*; Bibliog. of Agr. 8, No. 13,653 (1946).

Statistics of tung plantings.

Arnold, Julian

TUNG OIL INDUSTRY DEVELOPMENTS IN THE UNITED STATES.

Inspection & Commerce J. (China) 4 (12), 7-9 (1933)

The development of the tung industry in the United States is reviewed and numerous uses of the oil are listed. With proper study and the adoption of improved methods the Chinese tung industry should continue to prosper.

Arnold, Julian

U.S. CONSUMPTION OF CHINESE TUNG OIL.

Inspection & Commerce (China) 6 (4), 12 (1935)

The American paint and varnish industry consumed in 1934 almost 121,500,000 lbs. of Chinese tung oil valued at \$10,930,000. The cultivation of the tung tree is being investigated in Burma, Australia, New Zealand, Union of South Africa, Argentina, Brazil, Paraguay and the U.S.

Arnold, W.

TUNG OIL AS EDIBLE OIL.

S. Untersuch. Nahr. Genussm. 39, 30-3 (1920); Chem. Zentr. 1920, II, 812.

"The toxic oil appears to have been brought into Munich for distribution as edible oil.; the established constants were given. Tung oil is thick and very viscous. The refraction (n_D^{20} 1.51; degree of refraction 123.9) can be determined in an ordinary fat refractometer only indirectly by mixture with a fat (coconut oil) of lower refraction. On quick heating to about 250-260° it forms above 230° vapors in large quantity, then a foaming occurs at 250-260° and finally solidification to a gelatinous amber-yellow material. Likewise characteristic is the behavior of the material with chloroform-iodine solutions. With light excluded it becomes solid even in the absence of air; in air it dries quickly. With bromine it gives a scarcely weighable precipitate." Translated from Chem. Zentr.

Ashley, T.E., and Coleman, R.

TUNG MEAL GOOD NITROGEN SOURCE IN POPLARVILLE TEST

Mississippi Farm Res. 8 (3), 8 (Mar., 1945)*; Bibliog. of Agr. 6, No. 20,595 (1945).

Austin, M.F.

TUNG, OITICICA, AND DRYING OILS GENERALLY.

Am. Paint J. 30(5-A), 10, 12 (Oct. 31, 1945)*; Bibliog. of Agr. 8, No. 4292 (1946).

Austin, M.F.

WHAT'S AHEAD FOR RAW MATERIALS: TUNG OIL, WOOD OIL.

Paint Varnish Production Mgr. 25, 320,322 (Dec., 1945)*; Bibliog. of Agr. 8, No. 7133 (1946)

Aziz, M.A.

THE REACTION OF WOOD OIL AND ELEOSTEARIC ACID WITH BROMIDE AND BROMINE SOLUTIONS.

Thesis, Berlin, 58 pp., 1930.

Bacon, C.V.

SAMPLING CHINA WOOD OIL.

Chem. Age 32 (2), 86 (1924)

The same article appears as "Proper Sampling of China Wood Oil" by the same author

Paint oil Chem. Rev. 76 (21), 10 (1923); C.A. 18, 759 (1924).

Bahrt, G.M., and Potter, G.F.

EFFECTS OF FERTILIZER ON OIL CONTENT OF NUTS.

Tung World 3 (1), 16-19 (May, 1948)

Oil content of kernels was increased by K, unaffected by P and reduced by N.

Baker, C.M., and Andrews, W.B.

EQUIPMENT MADE TO APPLY AMMONIA TO TUNG ORCHARDS.

Mississippi Farm Res. 13 (6), 1, 8 (June, 1950)

Balbi, G.

THE BELGIAN PAINT AND VARNISH INDUSTRY.

Chim. peintures 12, 27-32 (1949); C.A. 43, 8209 (1949)

A review of the paint and varnish industry in Belgium naming the largest manufacturers. One of these produces 2.5 tons per day of a stand oil made of pure china wood oil. From C. A.

Ballard, Marshall, Jr.

TUNG MARCHES ON.

Tung World 1 (1), 4-5 (Apr., 1946)

B. predicts that tung production will remain profitable.

Ballard, Marshall, Jr.

SHEEP ASSET TO TUNG FARM.

Tung world 1 (2), 20-1 (May, 1946)

The grazing of sheep in tung orchards is profitable and aids in controlling weeds.

Ballard, Marshall, Jr.

NEED FOR RESEARCH IS STRESSED.

Tung World 1 (11), 12, 17-8 (Mar., 1947)

Research is needed to improve horticultural practices and methods of extracting oil from the tung fruit as well as to develop new uses for tung oil.

Ballard, Marshall, Jr.

FIELD HULLING SHOWS INCREASE IN PROFITS.

Am. Tung News 1 (5), 1-2, 11 (Mar., 1950)

An economic study in which oil losses are computed from analyses of tung fruit, hulled nuts and hulls, and increased profits from field hulling are calculated from oil losses and hauling and milling costs for field hulling in comparison with those for hulling at the mill.

Ballard, Marshall, Jr.

LAMB AND WOOL PRODUCTION ON TUNG ORCHARDS PROVES PROFITABLE

Am. Tung News 2 (1), 3-5 (1951)

A discussion of farm practices.

Barker, J.

TUNG FIRMLY ROOTED IN AFRICA.

Tung World 1 (8), 13, 26 (Dec., 1946); Bibliog. of Agr. 10, No. 14, 634 (1947)

Barnes, R.H.

FAT RANCIDITY AND BIOLOGICAL ANTIOXIDANTS.

Biol. Antioxidants, Trans. 1st Conf. 1946, 49-55; C.A. 42, 1640 (1948).

"Feeding rancid fat caused a marked depression of the growth rate of rats on purified diets. When the rancid fat was replaced with fresh lard the rats grew normally: other supplements had less effect. The stability of rat body fat was not affected by feeding antioxidants. Feeding tung oil decreased the stability while butterfat gave increased body-fat stability. The keeping time (stability) of the body fat of young rats on a vitamin E-deficient diet could be related to the tocopherol content of the fat. By such data it was shown that in such rats alpha- and beta-tocopherol are better deposited than the gamma-isomer."

Bartlett, Mark

TUNG OIL CO-OP FILLS A VITAL NEED.

News for Farmer Coop. 10(8), 18 (Nov., 1943)*; Bibliog. of Agr. 4, No. 3534 (1944)

Be, T.C.

METHOD OF CULTIVATING TUNG TREE. Ed. 2.

Pub. by Commercial Press, Shanghai, China, 72pp. 1934 (in Chinese)*

Belsunce, G. de.

THE TUNG TREE AND TUNG OIL.
Rev. botan. appl., 1932

Blackmon, G.H.

COVER CROPS FOR TUNG ORCHARDS.
Proc. Am. Tung Oil Assoc. 1940, 13-5

A number of good cover crops are described.

"In most locations, some of the cover-crops discussed can be grown successfully in tung orchard operations under suitable conditions of soil and moisture. Therefore, it would seem that an adequate program can be worked out which will meet the needs of the soil in different areas where the tung has been planted extensively. The physical condition of the soil will be greatly improved by growing suitable cover crops of legumes which will return large quantities of organic materials annually. Such a program should prove to be one which is economical to operate and materially benefit tung trees so that maximum production can be maintained where other factors are favorable." Conclusion from the paper.

Blackmon, G.H.

THE TUNG OIL INDUSTRY IN FLORIDA.
Fla. Univ. Bur. Econ. and Business Res. Econ. Leaflets, 4 (3),
4 pp. (Feb., 1945)*; Bibliog. of Agr. 7, No. 4532 (1945).

Blackmon, G.H.

TUNG OIL VITAL IN WAR OR PEACE.
Fla. Grower 53 (3), 20 (Mar., 1945)*; Bibliog. of Agr. 6,
No. 22, 831 (1945)

Blackmon, G.H.

TUNG OIL PRODUCTION IN FLORIDA.
Proc. Fla. State Hort. Soc. (1945) 58, 136-43 (1946)*; Bibliog.
of Agr. 9, No. 22,667 (1946).

Blackmon, G.H., and Dickey, R.D.

FERTILIZER RATIO TO YIELD.
Tung World 1 (3) 18. (July, 1946)

See "Fertilizer Ratio Experiments with Tung" by the same
authors (Proc. Am. Tung Oil Assoc. 1946, I, 8-12)

Blom, A.V.

PAINT MATERIALS

Paint Varnish Production Mgr. 4?, 10-11,40 (Feb., 1930)

For the evaluation of paint materials distinct methods of testing are necessary for pigments, vehicles, solvents, paints and painted surfaces. For the study of film formation, microphotographs of drying China wood oil films were taken through crossed Nicol prisms in a polarizing microscope. These showed not only the white bands produced by crystal masses of the strongly double refractive glyceride of beta-eleostearic acid but also

other bright spots due to strains within the material.

Blom, A.V.

SYNTHETIC TUNG OIL.

Peintures, pigments, vernis 16, 118-20 (1939)*; C.A. 34, 3514 (1940)

"Dehydration of castor oil yields 'Dicnol' (I), which is the triglyceride of octadeca-9,11-dienoic acid and free from compds. contg. only one double linking." I forms with HOCl an additive compd. (II), which on treatment with NMe_3 and removal of HCl and H_2O yields 'Trienol' (III), which appears to have the same constitution as tung oil. I-III are drying oils. III is less sensitive to light and wrinkles less readily than tung oil, but is more reactive and for technical purposes it is modified by addn. of other glycerides. Phys. and chem. consts. of I and III are tabulated. From C.A.

Boecking, O.

THE FROSTING OF TUNG OIL FILMS.

Farben Ztg. 31, 1910-1 (1926)

Böeseken, J., with Hoogland, J.J., Broek, A.G. van der and Smit, W.C.

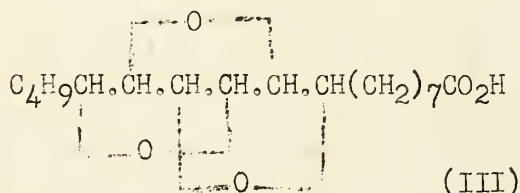
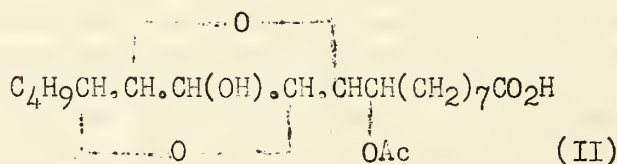
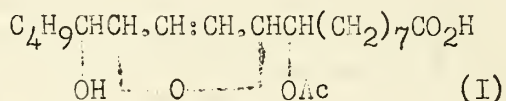
ALPHA-ELEOSTEARIC ACID FROM CHINESE WOOD OIL.

Rec. trav. chim. 46, 619-34 (1927); C.A. 22, 219 (1928).

"From the absorption of nearly 3 mols. of H in hydrogenation and from the high refraction of Chinese wood oil it had already been deduced that the principal constituent of this oil, alpha-eleostearic acid, contains a system of 3 conjugated double bonds (C.A. 19, 2475). In accordance with this view alpha-eleostearic acid quickly adds 2 mols. of Br while the 3rd. mols. can only be introduced by means of ultra-violet rays (Ber. 58, 216 (1925); cf. C.A. 19, 2475; 20, 2976), while it could now be shown that from the soln. of Wys 2 mol. of Cl-I are added quickly while the 3rd. mol. is only taken up after 6 days, I being liberated from the beginning of the reaction (C.A. 21, 1628). The same behavior was shown by a linolic acid contg. 2 conjugated double bonds, which was obtained by distn. of ricinelaidic acid, the constitution being established by ozonization as $\text{C}_6\text{H}_{13}\text{CH}:\text{CHCH}:\text{CH}(\text{CH}_2)_7\text{CO}_2\text{H}$, heptylic and azelaic acids being obtained. In order to prove the presence of a double bond in alpha-eleostearic acid tetrabromide this compd. was oxidized with peracetic acid which can be prepd. by adding com. 60% H_2O_2 to glacial AcOH, monoacetyldihydroxy-tetrabromostearic acid, $\text{C}_{18}\text{H}_{30}\text{O}_2(\text{OH})(\text{OAc})\text{Br}_4$, m. 106° , being obtained by the addn. of 1 mol. of AcO_2H to the double bond. Alpha-Eleostearic acid dibromide oxidized in the same way only takes up quickly 1 mol. of AcO_2H , while the 2nd mol. is added much more slowly and as the same behavior is shown by other compds. contg. a conjugated system of double bonds, the conclusion is drawn that the alpha-eleostearic acid dibromide still contains a conjugated system so that the satn. takes place according to

Thiele's principle. For comparison other unsatd. acids have been prepd. in which the position of the double bonds is known: (A) a linolic acid from carnation oil ("Huile d'oeillets") in which the double bonds are sepd. by a CH_2 group, on ozonization caproic and azelaic acid being formed, b_5 210° , n_D^{77} 1.4492, d_{77} 0.8674, I value 181.9; (B) a linolic acid obtained by distn. of ricinoleic acid and fractionation of the mixt. thus obtained, b_4 $232-5^\circ$, n_D^{77} 1.4574, d_{77} 0.8667, I value 126.9, showing that (B) is a mixt. contg. a large part of a substance with a conjugated system of double bonds; (C) a linolic acid prepd. by distn. of ricinoleic acid at ordinary pressure and recrystn. of the mixt. thus obtained from alc., the structure $\text{C}_6\text{H}_{13}\text{CH}:\text{CHCH}:\text{CH}(\text{CH}_2)_7\text{CO}_2\text{H}$ being established by ozonization (see above), $m.$ 52.2° , n_D^{77} 1.4624, d_{77} 0.8659, I value 111.1; Me ester, $m.$ 29.8° . A comparison of the oxidation of elaidic acid, the Me ester of (A), the acid (C), the Me ester of linolic acid and the Et ester of alpha-eleostearic acid with AcO_2H as well as with BzO_2H has shown that the oxidation of a substance with more than 1 double bond in general proceeds more quickly than that of an analogous substance contg. 1 double bond only and that in a conjugated system of double bonds the reaction is considerably retarded after the oxidation of the 1st double bond. This retardation not occurring after the oxidation of the first double bond in alpha-eleostearic acid but after the oxidation of the 2nd double bond, it is highly probable that after the oxidation of the 1st double bond a conjugated system of double bonds is still present in the mol. and that the oxidation occurs according to Thiele's principle. In order to investigate the oxidation products of alpha-eleostearic acid the latter was prepd. from Chinese wood oil in a pure state by sapon. of 150 cc. of the oil with 0.5 l. of boiling alc. KOH contg. 35 g. KOH, washing of the acid, liberated by means of 20 cc. concd. H_2SO_4 , repeatedly with boiling water and recrystn. from alc., $m.$ 47° ; acid Na salt, $m.$ 122° . With 1 equiv. of AcO_2H a sirup was obtained consisting of a dihydroxylinolic acid or its mono-Ac deriv., which according to its behavior with the soln. of Wijs, still contains a conjugated system of double bonds. The oxidation with 2 equivs. of AcO_2H again yields a sirup to which the formula I was ascribed, while with 3 equivs. a sirup was obtained, probably having the formula II. The oxidation of the Et alpha-eleostearate with 1 and 2 equivs. of AcO_2H did not give products to which a formula could be ascribed but to the product obtained with 3 equivs. of AcO_2H the formula III was assigned. The hydrogenation of alpha-eleostearic acid was carried out under pressure in an autoclave in order to keep the temp. as low as possible and thus to prevent the double bonds from moving during the reaction, a Ni catalyst being used which was prepd. by pptn. of NiCO_3 on silica gel and reduction at 500° by H_2 . With such a Ni catalyst Et cinnamate was reduced at 95° only in the side chain, the initial pressure being 60 atm. On reduction of Et alpha-eleostearate, n_D^{20} 1.5020, at 115° with an initial pressure of the H of 30 atm. until 1 mol. of H was

taken up, an oil was obtained, which, according to its behavior with the soln. of Wijs, still contains a conjugated system of double bonds. After the addn. of 2 mols. of H an unsatd. oil was obtained which on sapon. yielded an oleic or elaidic acid, m. 53°, to which the formula $\text{Me}(\text{CH}_2)_5\text{CH}:\text{CH}(\text{CH}_2)_9\text{CO}_2\text{H}$ was ascribed, the oxidation with KMnO_4 giving heptylic acid and nonanedicarboxylic acid and ozonization heptyl aldehyde, heptylic acid and nonanedicarboxylic acid. It thus appears that the halogenation, oxidation and reduction of alpha-eleostearic acid and of its esters proceeds in accordance with Thiele's principle.



From C.A.

Boeseken, J., Krimpen, J. van, and Blanken, P.L.
THE CATALYTIC REDUCTION OF ALPHA- AND BETA-ELEOSTEARIC ACID UNDER THE INFLUENCE OF NICKEL.

Rec. trav. chim. 49, 247-56 (1930); C.A. 24, 2985 (1930).

A detailed report on the hydrogenation of tung oil, Et α-eleostearite, β-eleostearic acid and Et β-eleostearate. Vaccenic acid was generally obtained. Discrepancies were found between the concentrations of saturated acids found in the partially hydrogenated tung oils when determined by the Bertram method as compared to other methods. (H and I nos.)

Boehm, Fred

WOOD OIL. ITS SOURCES, CHARACTER AND USES
London, 1902*

Boekennoogen, H.A.

MODIFIED OILS.

Verfkronek 23, 77-80 (1950)*; C.A. 44, 5609-10 (1950)

"Various processes are described for the improvement of natural oils, such as linseed, tung, castor, rape oils, for their use in paints and varnishes are reviewed, comprising removal of slimy substances, of free fatty acids, coloring matter, and antioxidants, addn. of drying metal compds. (PbO , Mn_2O_3) and of catalysts (H_2SO_4) to accelerate drying and polymerization, resp., of flushes to improve the wetting of pigments, sepn. of the oils into fractions having different properties, chem. reactions (polymerization, isomerization, blown oils, partially hydrogenated oils, reesterification.) Special mention is made of a new process of a mild isomerization of linseed oil, which does not darken the color of the oil but makes it even lighter, the film not showing any after-tack. This linseed oil, of which 50% of the fatty acid radicals contain a conjugated system of double bonds, stands between linseed oil and tung oil, in its properties resembling more the latter. Changes of the alc. group, e.g. substitution of glycerol by pentaerithritol or sorbitol, and condensation -- and copolymerization of the oils with other substances are also discussed." From C.A.

Boller, C., and Lichthardt, U.

WRINKLING.

Farbe u. Lack 12, 528 (1950)*; Fette u. Seifen 53, 51 (1951) (abstract)

A study of the inhibition of wrinkling of tung oil varnishes by different solvents. Tetralin was quite effective.

Bolton, E.R., and Williams, K.A.

COMPOSITION AND POLYMERIZATION OF CHINESE WOOD (TUNG) OIL
Oil & Fat Inds. J. 8, 447-8, 454 (1931)

Booth, D.C.

THE EFFECT OF FLORIDA TUNG OIL ON LACQUER FILMS.

Thesis, Univ. of Florida, 1928.*

See Flood, W.E., and Booth, D.C. with Beisler, W.H. "China Wood Oil in Lacquer. I." Ind. Eng. Chem. 20, 609-11 (1928).

Bottler, Max.

MODERN SICCATIVES.

Chem. Rev. Fett-u. Harz-Ind. 19, 265-7, 296-9 (1912); C.A. 7, 1106 (1913).

Pb tungate, the Pb salt of tung oil acids, was first obtained and tested by Gardner who claimed it to be an excellent drier. The author checked Gardner's results and concluded that Pb tungate is equal to but not superior to Pb linoleate. Co tungate appears equal to Co linoleate but it is not commercially produced. Metal tungates are less soluble than perillates, linoleates and resinates. Their drying power may be less influenced by moisture in the atmosphere that is the case with other driers.

Bradley, T.F.

NONEDIBLE SOYBEAN OIL PRODUCTS

In Markley, K.S. (ed.) Soybeans and Soybean Products, Vol. II, Chap. 21, pp. 853-890 Interscience Pub., New York, 1951.

In the manufacture of protective coatings tung oil is sometimes used with soybean oil to give products which dry more rapidly and to a harder film than soybean oil alone would furnish. The treatment of such mixtures with interesterification catalysts has been investigated. A review is also given of the reactions involved in the heat bodying and drying of the esters of linoleic, linolenic and eleostearic acids.

Branzanti, E.C.

THE ALEURITES.

Inst. Agricolo Coloniale Italiano, Florence, No. 41, 79 pp. 1916*.

B [ray], G.T.

THE PRESENT POSITION OF TUNG OIL PRODUCTION IN THE EMPIRE.

Bull. Imp. Inst. 43 (1), 14-8 (Jan./Mar., 1945); Bibliog. of Agr. 7, No. 8894 (1945).

Bray, G.T.

SOME EMPIRE VEGETABLE DRYING OILS.

Chemistry & Industry 1945, 293-4; C.A. 39, 5508-9 (1945)

"A lecture dealing with linseed, tung, perilla, oiticica, candlenut, castor, po-yok, and isano oils." From C.A.

Brookes, H.F.D.

THE SUBSTITUTION OF TUNG OIL.

Paint Manuf. 6, 36-7 (Feb., 1936); C.A. 30, 2778 (1936)

"A study shows that the need for 100% tung oil varnishes is limited. The function of tung oil is outlined and possible substitutes are discussed. It is concluded that oiticica oil is the only oil that is suitable as a 100% substitute for tung oil. A theory given for the formation of a lattice structure within the film points to the use of dispersed colloids in suitable solvents as substitutes. Natural resins do not form this type of colloidal structure." From C.A.

Brown, R.T., and Potter, G.F.

TUNG TREES AND COLD WEATHER.

Tung World 4 (6), 31-4, 39, (Oct., 1949)

"In a tung orchard at Lucedale, Mississippi, trees that had received liberal applications of nitrogen and potassium over a period of seven years, suffered practically no loss of bearing surface in a late freeze occurring on March 13, 1948, and set a full crop. The average loss of bearing surface on unfertilized trees, many of which were killed outright, was severe, and the crop was reduced by 75 to 80 percent. Data on yield, date of dropping of the mature fruit, shoot growth, and foliage disorders that have a bearing on cold resistance, are presented and discussed." Summary from the article.

Bruce, R.J., and Denley, P.G.

MALEIC ANHYDRIDE VALUE OR DIENE VALUE.

Chemistry & Industry 1937, 937*; C.A. 32, 1126, 1938.

"In detg. the maleic anhydride value (M.A.V.) of linseed, perilla and soybean oils during oxidation by the Ellis and Jones method the results were higher than expected. It was thought that the value might include any maleic anhydride that entered into combination with OH groups already in the oil or formed during oxidation. The M.A.V. of several hydroxylated substances which do not contain a conjugated system of double bonds was detd. and also the acetic anhydride value (A.A.V.) of several blown oils. The results show that the M.A.V. is not necessarily identical with the diene value. It may be possible to obtain the true diene value by the difference between the M.A.V. and the A.A.V. but it would be necessary to ensure complete esterification in each case, which would require longer heating than the 3 hrs. or 1 hr. catalytically, which suffices for the diene reaction of tung oil." From C.A.

Bruno, F.

EXPERIMENTS IN ALEURITES.

Boll. studi ed informazioni R. Giardino coloniale Palermo 17, 53-77 (1940)

A general review of tung oil production, properties and trade.

Brunot, H.

THE CULTURE OF ALEURITES IN INDO-CHINA

L'Agria 147, 51-4 (1950)*; Olearia 4 (7/8), 345 (1950) (abstract)*; Oleagineux 6 (1), 59 (1951)

"Commercial and industrial importance of Chinese wood oil. Botanical and agronomic characteristics of the species most cultivated in Indo-China (A. montana and A. fordii). Cultural practices; choice and preparation of land, nurseries, fertilizing, harvesting and extraction of oil." Translated from Oleagineux.

Bryan, C.E.

DETOXIFICATION OF TUNG MEAL

South. Research Inst. Quart. Bull. 2 (2), 9-10, 15 (1949)

Burtis, E.L., and Gershen, S.

TUNG NUTS OUTPUT SOARS IN LAST DECADE.

Agr. Situation (U.S. Bur. Agr. Econ.) 33 (10), 12-3 (Oct., 1949)

A brief review of the tung industry in the U.S. with emphasis on economic aspects. During World War II uses of tung oil were restricted to military products.

Buser, Karl

THE FOUR-YEAR PLAN AND THE QUESTION OF LINSEED OIL-WOOD OIL-SUBSTITUTES.

Farben-Chem. 3, 77-8 (1937)

A discussion of the possibilities of using whale and fish

oils as substitutes for linseed and wood oils.

Bush, W.A.

LINSEED OIL FOR TUNG AND PERILLA OIL REPLACEMENT.

Official Digest Federation Paint Varnish & Production Clubs
No. 203, 65-77 (1941); Brit. Chem. Abstracts 1941, B, II, 191.

"Tung and perilla oils can be eliminated from many varnish formulations by using best-quality linseed oil, bodying the oil to very high, and using special resins, e.g., alkyd-modified resin esters, pentaerythritol abietate, etc. Methods and formulae are given." From Brit. C.A.

Chang, C. C., Ling, K., and Liu, H.

TUNG OIL INDUSTRY IN CHINA.

China Trade Monthly 1, 109-11 (Feb., 1947)*; Bibliog. of Agr. 11, No. 5690 (1947).

Caldwell, M.F.

FLORIDA AND TUNG

Tung World 1 (5), 4 (Sept., 1946); Bibliog. of Agr. 10, No. 11,620 (1947).

Campbell, C.

FIELD HULLING, PLANT HULLING.

Am. Tung News 1 (4), 10 (Feb., 1950)

Field hulling for tung fruit is more profitable than plant hulling for the grower because of reduced costs for hauling the crop to the mill and for hauling hulls away from the mill.

Cardinell, H.A., and Hayne, D.W.

PEN TESTS OF RABBIT REPELLENTS

Mich. Agr. Expt. Sta. Quart. Bull. 29, 303-14 (1947)*; C.A. 41, 7640 (1947).

"Tung oil is listed among the groups of materials which showed little or no repellency." From C.A.

Carlevari, I.F.

SOME CONSIDERATIONS PERTAINING TO THE ECONOMICS OF TUNG, POSSIBILITY OF COMPETITION WITH LINSTED.

Bolsa de Com., Rosario. Rev. 34 (829), 5-11 (July 31, 1946)*; Bibliog. of Agr. 10, No. 4923 (1947).

Carpenter, J.H.

UNREMARKABLE CHINESE CONVERT OLD BOILER INTO STILL FOR CRACKING TUNG OIL.

Petroleum News 35 (36), 21-2 (Sept. 8, 1943)*; Bibliog. of Agr. 3, J, 26 (1943)

Carter, G.E.

EAST TEXAS PRODUCES TUNG SUCCESSFULLY.

East Texas 21 (8), 6 (May, 1947)*; Bibliog. of Agr. 11, No. 1744 (1947).

Casamiquela, O.M.

TUNG HARVESTING.

Chacra 20 (235), 68-9 (June, 1950);

Champenois, C.

THE CULTURE OF ALFURITES FORDII OR TUNG IN MADAGASCAR.

Rev. intern. bot. appl. et agr. trop. 26, 95-100 (Mar./Apr. 1946)*; Bibliog. of Agr. 10, No. 21,016 (1947).

Champetier, G., and Fournier, P.

POLYAMIDES OBTAINED FROM THE FATTY ACIDS OF DRYING OILS.

Bull. Soc. Chim. France, [5] 17 (9/10), 881-3 (1950); Tech.

Rev. (Calif. Research Corp.) 50, 158 (Feb. 17, 1951)

"The fatty acids of drying oils (Linseed oil, tung oil) combine with diamines (ethylene-or hexamethylene-di-amine) to form diamides which, by heating or oxidation, polymerize to form linear polyamides. Linear polyamides obtained by thermic polymerization can also autoxidize, probably forming a tridimensional macro-molecular lattice. The diamides of the fatty acids of drying oils behave analogously to the polyesters, especially the corresponding triglycerides of these acids. (In French)." From Tech. Rev.

Chang, C.C., Ling, K., and Liu, H.

TUNG OIL INDUSTRY IN CHINA.

China Trade Monthly 1 (1), 33-6, 61-3 (Jan., 1947); Bibliog. of Agr. 10, No. 34,970 (1947)

Chang, C.C., and Wan, Shen-Wu

CHINA'S MOTOR FUELS FROM TUNG OIL.

Ind. Eng. Chem. 39, 1543-8 (1947); C.A. 42, 1037. (1948).

"Crude oils were prepd. by (a) destructive distn. of a vegetable oil and the simultaneous or subsequent cracking of its vapors, (b) liquid-phase cracking of a vegetable oil with or without catalysts, and (c) pyrolysis of the soap of vegetable oils. The percentages of the crude products from tung oil boiling to 200° and 300°, resp., were a 36,89, b without catalyst 45 (at 200°), b with catalyst 24,55, and c 22, 65. Flowsheets are given for batch cracking under pressure, for soap-cracking, and the manuf. of vegetable gasoline. The vegetable gasoline produced is an effective motor fuel having a higher calorific power and volatility than alc. This av. com. yield of crude oil was 70% by vol. of the original oil, and the gasoline content in crude oil was 25% by vol." From C.A.

Chang, C.Y.

TENTATIVE METHODS OF ANALYSIS AND STANDARDS ON VEGETABLE OILS.

Pub. by the Govt. Testing Bureau, Tientsin, China, 87 pp., 1932 (in Chinese)*

Chang, W.J.

METHOD OF TESTING TUNG OIL.

International Trade Bull. 1, No. 1 (1930)*

Chen, C.S.

SUGGESTIONS FOR IMPROVEMENT OF TUNG OIL OF HUNAN.

Pub. by Reconstruction Bur., Hunan, China, 26 pp.; 1935
(in Chinese)*

Chen, H.F.

ANALYSIS OF TUNG NUTS.

Shanghai Univ., Collected Sci. Papers 4, 145-55 (1934)(in Chinese)*

Cheng, Fa-Wu

CHINA PRODUCES FUELS FROM VEGETABLE OILS.

Chem. & Met. Eng. 52 (1), 99 (1945); C.A. 39, 4441 (1945)

"A "crude oil" suitable for processing to gasoline, Diesel fuel, etc. can be obtained from tung oil and other vegetable oils through thermal or catalytic cracking. In high-pressure cracking (50-150 lb. per sq. in., 400-500°) the raw oils are charged as such, giving about 75% by wt. ultimate yield, 50% of which is a "light spirit." In atm. cracking the oils are usually charged as lime soaps, giving about 50% by wt. ultimate yield. Distns. of crude oils and fractions are given." From C.A.

Child, J.I.

CHINESE OIL TREE

U.S. Cons. Repts., (U.S. Dept. Com. & Labor) No. 203, 480-2 (Aug., 1897); J. Soc. Chem. Ind. 16, 684 (1897)

"The wood oil tree, or Aleurites Cordata, belongs to the family very common in China known as the "tung". The wood-oil tree is the ying tzu tung, so called from the shape of its fruit--ying means a jar. It is also known as the yiu tung or oil tung. It is found chiefly in Hunan, Hupeh, and Szechuan. The seeds are large and poisonous, and it is from them that the oil is expressed. The fruit is gathered in August and September. * * * The best wood oil comes to Hankow from Shin-chau Fu, in Hunan. The oil is given as a remedy in insanity and in cases of metallic poisoning. It is emetic, acro-narcotic, and drastic, proving destructive to rats in a very short time. It is applied as a stimulant to carbuncles, ulcers, burns, swellings, and bruises, and is a constant ingredient in native plasters. It was forbidden to be exported during the Taiping rebellion, as it is a necessary article for shipyards." From J. Soc. Chem. Ind.

Chinery, F.L.

EFFECT OF DRIER ON DURABILITY OF PAINTS

Paint, Oil Chem. Rev. 24, (10), 78, 80, 88; (1932)*; Am. Paint Varnish Mfrs. Assoc. Circ. 423, (1932)* Paint Varnish Production Mgr. 8 (6), 22-3, 32 (1932)*; C.A. 27, 613, (1933)

"The effect of an excessive amt. of drier on the durability of paints, etc., being unsettled a 30-gallon ester gum-linseed oil and a 30-gallon ester gum-tung oil varnish were prepd. to sep. portions of each were added increasing amt. of Co, Mn and Pb driers in the forms of linoleate and naphthenate. After 11 weeks of exterior exposure, the linseed oil varnishes contg. the larger amts. of Mn and Co driers of both types showed checking and cracking. All other films were sound." From C.A.

Chiu, L.Y.

FORECASTING THE TUNG OIL TRADE FOR 1947.

China Trade Monthly 1 (1), 28, 58 (Jan. 1947)*; Bibliog. of Agr. 10, No. 35,534 (1947).

Cho, Y.Y.

METHOD OF CULTIVATION OF OIL-PRODUCING CROPS. CHAP. VII. TUNG TREE.

Pub. by Commercial Press, Shanghai, China, 1934 (in Chinese)*

Chopp, C.C.

TUNG OIL. PAST, PRESENT AND FUTURE.

Am. Paint J. 30 (42), 18-9, 22 (July 15, 1946)*; Bibliog. of Agr. 9, No. 16,879 (1946)

Chow, W.Y.

AMERICAN STANDARDS OF TUNG OIL TESTING.

Chinese Soc. Chem. Ind. J. and Proc. 3 (2), 197-216 (July, 1925) (in Chinese)*

Chu, T.Z.

PRODUCTION OF TUNG OIL IN SZECHUAN PROVINCE.

Govt. Testing Bureau of Hankow, China: Pub. by Wan-Hsien Branch, 100 pp., 1935 (in Chinese)*

Chuang, K.

AUTOXIDATION OF ALPHA-ELEOSTEARIC ACID

Unpub. thesis, Yenching Univ., Peiping, China, 1936 (in Chinese)*

Clarence, B.V.

TUNG TREE CHARACTERISTICS IN THE UNION (OF SOUTH AFRICA)

Farmer [Pietermaritzburg] 33 (1), 7 (Jan. 7, 1944)*; Bibliog. of Agr. 7, No. 1699 (1945).

Clark, G.L., Aborn, R.H., Brugmann, E.W., and Davidson, R.L.

X-ray diffraction patterns from liquids and colloidal gels.

Proc. Natl. Acad. Sci. 13, 549-52 (1927); C.A. 21, 3551-2 (1927).

"The following results, expressed as % change related to the spacings of the raw liquid oil calcd. by the Bragg formula, were obtained with China wood oil:

	Inner ring	Outer ring
Raw liquid	8.5 A.U.	4.4 A.U.
Raw dry film (Oxidized at room temperature)	+6%	+1%
Raw gel (Polymerized by heat)	+3	+2
Prepd. liquid	+12	+16
Prepd. dry film	+13	+6

From C.A.

Clark, H.W.

RELATIONSHIP OF TUNG TO NEW INDUSTRIES.

Proc. Am. Tung Oil Assoc. 1947, 69-72

A brief discussion of economic factors controlling the location of industries.

Cleveland Paint and Varnish Production Club

A STUDY OF ANTIOXIDANTS AND ANTISKINNING AGENTS.

Am. Paint J. 30 (6B, Convention-at-Home Daily), 34-5 (1945)*; Official Digest Federation Paint & Varnish Production Clubs No. 251, 484-9 (1945)*; Paint, Oil Chem. Rev. 108 (23), 9-10, 12 (1945); C.A. 40, 474, 1677 (1946)

"Antioxidants are agents which retard the normal oxidation process of drying comps. The material believed to possess antioxidant properties and tried out by the Comm. were: 50 gal. phenolic resin-tung oil, 25 gal. ester gum-tung oil, 25 gal. modified phenolic-linseed oil, 40 gal. modified phenolic linseed oil and medium-oil-length linseed-oil alkyd resin."

From C.A.

Coffignier, Ch.

THEORIES OF BODIED OILS.

Mon. sci. (4) 20, I, 106-7 (Feb., 1906); Chem. Zentr. 1906, I, 795.

Theories of oil bodying are compared. The authors claim to have made good products from wood oil.

Concannon, C.C.

ECONOMIC AND COMMERCIAL FACTORS IN DEVELOPMENT OF A DOMESTIC TUNG INDUSTRY.

Am. Paint J. 20, 18, 20, 50, 52, 54, 56 (Oct. 28, 1935)

Markets for tung oil have been increasing but the supply of the oil that is available from China is limited. Efforts are being made to introduce the tung tree into Burma, South Africa, Australia and New Zealand but American needs can **best** be met by a domestic production. The infant tung industry in the South is assured a steady market in the future for the high quality oil

which it is now beginning to produce.

Concannon, C.C.

Economic value of tung oil - a national viewpoint.

Am. Paint J. 23, 21-2, 24, 50, 52, 54, 56, 58, (Apr. 3, 1939)*;
Paint, Oil Chem. Rev. 101 (10), 20, 22, 24, and 26 (1939) C.A.
23, 4442 (1939)

The rapid progress made by the tung industry in the U.S. is described and the research work on tung culture done by the Bur. of Chemistry and Soils is reviewed.

Cooper, Francis

AMERICAN TUNG OIL PRODUCTION.

Oil & Fat Inds. 6, 27-8 (1929)

The world's first power-operated mill for the extraction of tung oil has been built at Gainesville, Fla., to process fruit grown by the Alachua Tung Oil Corp. and the American Tung Oil Co. Its equipment and operation are described.

Crane, H.L.

THE TUNG OIL INDUSTRY OF CHINA.

Proc. Am. Tung Oil Assoc. 1947, 42-54

A thorough review of agronomic, technological and economic factors pertaining to the production of tung oil in China.

Crane, H.L.

TUNG PRODUCTION

U.S. Bur. Plant Ind., Soils, Agr. Eng., Washington, 14 pp.,
processed, n.d.; Bibliog. of Agr. 6, No. 203 (1945).

Crane, H.L.

THE CONDITIONING OF TUNG NUTS.

Washington? 3 pp.*, 1948. Bibliog. of Agr. 12, No. 68,604 (1948).

Crane, H.L., Sitton, B.G., and Potter, G.F.

FIVE NEW VARIETIES OF TUNG

Tung World 2 (10), 17, 26 (Feb., 1948)

Five outstanding varieties of tung, now released for commercial distribution, are: Isabel (formerly L-2), Gahl (formerly L-51), LaCrosse (formerly F-99), Lamont (formerly F-542) and Cooter (formerly F-4).

Crossley, A., and Hilditch, T.P.

THE COMPONENT ACIDS OF SOME AUTHENTIC AND COMMERCIAL STILLINGIA OILS.

J. Sci. Food. Agr. 1, 292 (1950); J. Am. Oil Chemists' Soc. 28, 75 (1951)

"Stillingia oils from 3 specimens of seeds of Sapium sebiferum and from 2 specimens of seeds of S. discolor have been examined and the component fatty acids found to include about 5% deca-2:4-dienoic acid, 8% oleic acid, 12% saturated acids, 25-50% linoleic and 35-50% linolenic acids. The proportions of the latter two acids vary with the species and the season. The presence of eleostearic acid in commercial stillingia oils has been reported but is believed to be due to contamination with tung oil." From J. Am. Oil Chemists' Soc.

Cuppini, U.

THE VARNISH INDUSTRY IN ITALY
Chim. peintures 10, 44-6 (1947)

The protective coating industry of Italy is reviewed with production figures for paints, varnishes and enamels. There are used annually for oil paints 200,000 quintals of linseed oil and 5000 quintals of wood oil. The latter can be replaced by synthetic oils such as dehydrated castor oil.

Cutter, J.O.

THE POLYMERISATION OF DRYING OILS.
Paint Varnish Production Mgr. 1930, 16-7, 23 (Mar., 1930)

A review of the chemical changes that occur during heating of tung and of linseed oils.

Dalton, J.

MYSTERY OF TUNG OIL SOLIDIFICATION.
China Trade Monthly 2, 451,480 (May, 1948)*.

Davies, R.H.

NOTES ON THREE NEW CHINESE FIXED OILS.
Pharm. J. 15, 634-6 (1885)

Tea oil, cabbage oil and wood oil (Elaeococcus cordata) were consigned to a London broker with a view of their being regularly exported from China if a market could be found for them.

Examination of the wood oil gave the following results: color, brown; odor, unpleasant; sp. gr. (60°), 940.15; exposure to -13.3°C., no change; H₂SO₄, blackens; HNO₃, forms orange-red solid; HNO₃ + Hg forms dark colored solid; acidity, requires 0.39 g. KOH for 1,000 g. oil; sapon. no., 211 g. KOH for 1,000 g. oil; Acidification of the K soap yielded a crude brown acid m. 39°C. After solution in alcohol, treatment with animal charcoal and recrystallization, white cryst. plates, m. 67°C. were obtained.

Deasy, G.F.

TUNG OIL PRODUCTION AND TRADE.
Econ. Geog. 16 (3), 260-73 (1940)*; Biol. Abstracts 16, 1234, Abs. No. 13,295 (1942)

"Tung oil, outstanding export of China, is the best-known

drying, water-proofing oil of vegetable origin. For decades China has maintained an export monopoly; the U.S. has consistently taken from 2/3 to 3/4 of this export. Tung production is being attempted in many countries, notably in the U.S. and several British Colonies and Dominions. In China trees are located on poor soil or rough areas unsuited to food crops in western and southern China. Two spp. of trees are found, the true tung tree (Aleurites fordii) a deciduous tree requiring a cool dormant season, and a tropical var. (A. montana) producing an oil chemically identical with that of A. fordii but in smaller quantity. Trees were planted in southern U.S. in 1902 but the industry as a commercial enterprise began in 1925. The producing belt which extends across the southern portion of our states from the Gulf counties of Texas through Georgia and northern Florida has climatic boundaries. Winters must not be too severe, late spring frosts must be rare, there must be a 3-month dormant period, and a minimum rainfall of 30 in. Soil requirements are exacting: soils must be fertile, acid, and well-drained. Advantages for the Southern states are descr. Production is still small and in the exptl. stage." From Biol. Abs.

Dee, W.E.

PURPOSE OF TUNG COVER CROPS.

Am. Tung News 2 (2), 10 (Feb., 1951)

Cover crops in tung orchards reduce erosion and increase the soil content of organic matter and nitrogen.

Delong, H.K.

IMPREGNATION OF MAGNESIUM CASTINGS.

Light Metal Age 2, (3), 10-11, 18 (1944)*; C.A. 38, 3940 (1944)

"The styrene drying oil copolymer process, the tung oil process, and the silicate process for impregnating Mg castings are discussed in detail. The polymerizing treatments are preferred over the silicate treatment since the treating materials and the substances remaining in the casting are nonelectrolytes, and thus do not have a corrosive influence on the casting. Advantages of the styrene-oil copolymer process over the tung oil process are listed. The silicate process appears to be limited to chamber impregnations, and it is more difficult to seal castings adequately against air pressure tests by this method. The advantages in this method are the low cost of the soln. and the fact that org. solvents are not required for rinsing; the disadvantages are the difficulty in rinsing all silicate from the surface, possible attack on non-Mg inserts, and the abrasive nature of areas so impregnated during machining." From C.A.

Demaree, J.B., and Large, J.R.

LEAF VARIEGATION IN TUNG

Phytopath. 38, 658-60 (1948); Biol. Abstracts 23, 234, Abs. No. 2029 (1949)

Tung trees with variegated leaves have been observed. The cause is suspected to be a genetic factor.

Dickey, R.D., and Lowry, Harold

THE EFFECT OF ROOT-KNOT UPON THE SUBSEQUENT GROWTH OF TUNG-OIL (ALBURITES FORDII) SEEDLINGS.

Proc. Am. Soc. Hort. Sci. 36, 389-92 (1938)*; Biol. Abstracts 13, 1583, Abs. No. 15,819 (1939)

"19 tung seedlings severely affected with root-knot (Heterodera marioni) were planted in the field in Feb., 1932. The root systems of the trees remaining alive were examined in Feb., 1936. On 18 of the trees, all trace of the root-knot injury had disappeared. The infected tree was replanted and when taken up in Dec., 1938 it was found that all signs of the root-knot injury had disappeared. Tung seedlings are quite susceptible to attack by the root-knot nematode their 1st. growing year in the nursery whereas these same seedlings, when planted in the field at 1 yr. of age or older, are apparently quite resistant, if not immune. Severely affected seedlings, when planted in the field, show no further infestation, so far as the root system is concerned." From Biol. Abstracts

Doughtie, R.T., Jr.

SOME OBSERVATIONS ON ANALYTICAL RESULTS RECEIVED DURING 1947-48 TUNG PROGRAM.

Proc. Am. Tung Oil Assoc. 1948, 73-7

Between Dec. 1, 1947, and Mar. 1, 1948, analyses were made on 12,000 tons of tung fruit under contract with Commodity Credit Corporation. The official method was the whole fruit method although the component part method was permitted provided every seventh sample was checked by the whole fruit method. The two methods have shown satisfactory agreement. The average oil content found was 17.2% for fruit of an average moisture content of 22.2%.

Drinberg, A. Ya.

THE USE OF ESTERS OF UNSATURATED ACID AS SUBSTITUTES FOR TUNG OIL IN VARNISHES.

Org. Chem. Ind. (U.S.S.R.) 4, 114-17 (1937)*; C.A. 32, 1952 (1938)

"Preliminary comparative tests indicate that varnishes obtained from pentaerythritol esters of linseed oil acids and their mixt. with polymerized linseed oil (1:1) gives films equal in their rates of drying and aging and in phys. and tech. properties to those prepd. with tung oil." From C.A.

Drinberg, A. Ya. and Matveenkov, A.

SUBSTITUTES FOR TUNG OIL FOR ENAMELS FOR COVERING COPPER WIRE.

Org. Chem. Ind. (U.S.S.R.) 4, 296-297 (1937)*; Brit. Chem. Abstracts 1938, B, 184; C.A. 32, 6888 (1938).

"Tung oil may be replaced by a mixture of Japanese sardine oil and linseed oil." From Brit. Chem. Abstracts.

Drosdoff, Matthew

MAGNESIUM DEFICIENCY OF TUNG TREES.

Proc. Am. Soc. Hort. Sci. 44, 1-7 (1944); C.A. 38, 4739 (1944).

"A marginal leaf scorch observed in a no. of orchards in Florida is believed the result of Mg deficiency.***" From C.A.

Treatment with $MgSO_4$ was effective in its control.

Drosdoff, Matthew

METHODS OF ANALYSES USED IN THE TOTAL QUANTITATIVE DETERMINATIONS OF THE MINERAL ELEMENTS IN TUNG LEAVES AT THE U.S. FIELD LABORATORY FOR TUNG INVESTIGATIONS GAINESVILLE, FLORIDA.

U.S. Bur. Plant Indus., Soils, Agr. Eng. Gainesville, Fla., 18 pp., processed, 1946 Bibliog. of Agr. 11, 27725. (1947).

Determinations include Ca, Mg, Cu, Zn, Fe, B and Mn.

Drosdoff, Matthew

THE USE OF MINOR ELEMENTS ON SOILS.

U.S. Dept. Agr. Yearbook, 1943-1947, 577-582

The use of Mg, Cu, Zn, and Mn in tung orchards is mentioned.

Drosdoff, Matthew

SUITABILITY OF VARIOUS SOILS FOR TUNG PRODUCTION.

U.S. Dept. Agr. Circ. 840, 23 pp. (1950)

"It has been found that the best soils for tung production are of the following series: Ruston, Red Bay, Orangeburg, Norfolk, Magnolia, Marlboro, Greenville, Faceville, Tifton, and Carnegie. All of these are well-drained upland soils with a relatively sandy surface and subsurface and a sandy-clay-loam to sandy-clay, friable, uniformly colored subsoil."

"In many instances production has been low on the best soils because of lack of adequate cultivation, fertilization, or both."

"The Ora and Savannah soils on which a large acreage of tung has been planted in Louisiana and Mississippi are productive soils for tung, but probably will not reach the high level of productivity of the Ruston and related soils. Orchards located on the sandy soils in peninsular Florida have not produced so well as those on the heavier soil, even when they have received good management."

"---the poorly drained soils such as the Caddo, Susquehanna, Leon, Scranton, and Pheba soils are not suitable for tung." Selections from the circular pp. 21-22.

Drosdoff, Matthew, and Dyal, R.S.

USING SOILS RESEARCH FOR BETTER TUNG ORCHARDS.

Proc. Am. Tung Oil Assoc. 1942, 6-10

An introduction to soil chemistry.

"The soils of the tung belt do not have a great reservoir for holding water, and during periods of extreme drought the trees may suffer from lack of moisture. Therefore, in the soil management program of a tung orchard, consideration should be given to practices which will conserve soil moisture especially

during the dry seasons." From the article.

Drosdoff, Matthew, and Lagasse, F.S.

EFFECT OF SOIL AND CROP ON ABSORPTION OF MINERAL ELEMENTS BY TUNG TREES.

Proc. Am. Tung Oil Assoc. 1942, 1-2a

"That the amount of crop produced is an important factor in determining the amount and proportion of the different elements that are absorbed by the tree can be cited from a fertilizer experiment that is being conducted near LaCrosse, Florida. It was found that a heavy crop lowered the potassium content of the leaves in spite of increased potash applications. The lowering of the potassium level in the leaves was associated with an increase in magnesium content of the leaves even though no magnesium was applied." From the article.

Drosdoff, Matthew, Lagasse, F.S., and Blackmon, G.H.

SYMPTOMS AND CORRECTIVE TREATMENTS FOR MAGNESIUM DEFICIENCY IN TUNG TREES.

Proc. 10th. Ann. Convention Am. Tung Oil Assoc. and United Tung Growers' Assoc. 1944, 64-7; *C.A. 39, 2610 (1945)

See "Magnesium Deficiency of Tung Trees" by M. Drosdoff (Proc.-Am. Soc-Hort-Sci. 44, 1-7 (1944))

Drosdoff, Matthew, and Nearpass, D.C.

QUANTITATIVE MICRODETERMINATION OF MAGNESIUM IN PLANT TISSUE AND SOIL EXTRACTS: A RAPID COLORIMETRIC METHOD.

Anal. Chem. 20, 673-4 (1948); C.A. 42, 7658-9 (1948).

"The method is based on that of Peech and English (C.A. 38, 4362) with thiazole yellow (cf. Mikkelsen and Toth, C.A. 41, 2831) as indicator. For plant materials, ash the sample, ext. with HCl, and take an aliquot contg. 0.025 to 0.15 mg. of Mg. Dil. to 25 ml. with water, add 1 ml. of 5% hydroxylamine-HCl soln., and 5 ml. of a 1:1 mixt. of 2% starch soln. and compensating soln. (contg. 3.7 g. $\text{CaCl}_2 \cdot 2 \text{H}_2\text{O}$, 0.74 g. $\text{Al}_2(\text{SO}_4)_3 \cdot 18 \text{H}_2\text{O}$, 0.36 g. $\text{MnCl}_2 \cdot 4 \text{H}_2\text{O}$, 0.60 g. Na_2PO_4 , and 10 ml. concd. HCl per l.). Add exactly 1 ml. of 0.10% soln. of thiazole yellow, then 5 ml. of 2.5 N NaOH soln., and dil. to 50 ml. After 10 min. read the color with a photoelectric colorimeter using a green filter. Compare the color with standards. For soils, use a 0.1 N acid soln. of the NH_4OAc ext. The standard deviation of a single detn. is 0.019%; the standard error is 4% of the mean of all detns. Results are given for the Mg content of tung leaves and of various southern-U.S. soils." From C.A.

Drosdoff, Matthew, Neff, M.S., and Merrill, Samuel, Jr.

CONTROL OF WEEDS VITAL IN ORCHARD.

Tung World 2 (3), 8, 19, 22; (4), 31-2 (1947)

"The need for completely controlling the weeds in the young orchard can not be overemphasized. This is the main consideration regardless of the method.** Depending on the season and local conditions, either a good mulch or at least four to six good

cultivations are necessary during the spring months in order to get satisfactory growth of young trees." From the article. Pt. 2 has title "Cultivating newly planted tung trees."

Drosdoff, Matthew, Neff, M.S., and Merrill, Samuel, Jr.

IMPORTANCE OF CULTIVATING TUNG TREES IN THEIR FIRST YEAR IN THE ORCHARD.

Proc. Am. Tung Oil Assoc. 1947, 58-60

Young trees respond strikingly to cultivation. Four to six cultivations are necessary during the spring months of the first year in order to get satisfactory growth.

Dufrenoy, J.

THE TUNG OIL INDUSTRY IN THE UNITED STATES.

Agron. Coloniale 23 (197), 146-7 (1934).

Dull, G.J.

TUNG OIL SEALS POROUS CASTINGS.

Am. Tung News 1 (9), 3/13/4 (Apr., 1950)

"Where properly applied, the impregnation of ferrous and nonferrous castings with tung oil offers an economical and practical method of suppressing leaks due to micro shrinkage and micro gas porosity. Large holes cannot be reliably sealed with tung oil." From the article.

Methods for the process are described.

DuSautoy, W.

ESSENTIALS FOR ECONOMIC TUNG TREE CULTURE. THE QUESTION OF BUDWOOD AND SEEDLINGS.

Farmers' Weekly [Bloemfontein] 66, 786-7 (Jan., 12, 1944)*;

Bibliog. of Agr. 4, No. 18, 112 (1944).

DuSautoy, W.

HOW TO ESTABLISH A TUNG TREE PLANTATION. PREPARATION OF SEED-BEDS AND LAND TO ENSURE SUCCESSFUL GROWTH.

Farmers' Weekly [Bloemfontein] 66, 934-5 (Feb. 2, 1944)*;

Bibliog of Agr. 4, No. 23, 455 (1944)

Dye, Dr.

CHINESE WOOD OIL.

Drugs Oils & Paints 40, 164 (1924); C.A. 19, 406 (1925)

"A review of native production methods." From C.A.

"The oil is used as a varnish for floors and woodwork in the foreign houses in West China. The floors are covered with a coloring matter and then covered with this wood oil varnish. Under repeated washing, or at least, continuous washing of at least once a week, the oil wears indefinitely, but if it is not washed in this way it becomes sticky after a matter of from seven to ten years so that it has to be removed and the floor revarnished. The oil is also used with quicklime or lime and pounded in a mortar and used as putty for glazing windows. It is used with bamboo shavings for calking boat bottoms and outlasts

the wood." Excerpt from Drugs, Oils and Paints.

Eckmann, C.

WOOD OIL IN THE PRINTERS-INK INDUSTRY.

Farben-Chem. 6, 295-7 (1935)*: C.A. 30, 2409 (1936).

"A general discussion emphasizing the advantages of using wood oil in making bronze and similar inks contg. metallic particles." From C.A.

Eibner, A.

THE PRESENT POSITION AS REGARDS THE INVESTIGATION OF THE FATTY DRYING OILS.II.

Paint Varnish Production Mgr. 1929, 4,6,8,10-2 (Sept., 1929)

The drying of oils is thoroughly reviewed under the following headings: (c) the colloidal view of the so-called polymerization change during oil drying, (d) the theory of the formation and drying of heat bodied oil, (e) the latest theories as to normal drying practice, (f) new discoveries concerning China wood oil, and (g) the significance of isomers in oil research.

Eibner, A.

DRYING OF OILS.

Farben-Ztg. 35, 285-7, 336-7 (1929); C.A. 24, 3659 (1930)

"The status of the information on the drying of oils is briefly summarized with special reference to the work of Morrell and Marks. (cf. C.A. 23, 4834)". From C.A.

The discussion includes the reactions of β -eleostearin, its crystalline properties, the formation of a β -eleostearin diperoxide, the reaction of β -eleostearin films with p-nitrophenylhydrazin.

Eibner, A., and Pallauf, F.

ACCELERATION OF THE DRYING OF FATTY OILS BY MEANS OF DRIERS. Chem. Umschau Fette, Oele Wachse u. Harze 32, 81-95, 97-110 (1925); C.A. 19, 2420 (1925)

"A general review with special reference to (1) artificial driers -- (a) linoleates and resinates, (b) linoleate-oleates, linolates, palmitates, (c) tungstates, [sic] and others; (2) influence of the amt. of driers upon the drying time; (3) influence of the temp.; (4) drying energies of the individual metals; (5) Pb-Mn boiled oils, prepn. of boiled oils, polymerized oils, aging of boiled oils, theory of the drying of fatty oils and the effect of driers in the prepn. of boiled oils." From C.A.

Eijnsbergen, J.F.H. van

THE CHEMICAL RESISTANCE OF SOME INTERNALLY PLASTICIZED PHENOL-FORMALDEHYDE RESINS.

Chem. en Pharm. Tech. (Dordrecht) 5, 133-4 (1950)*; Natl.

Paint Varnish Lacquer Assoc., Sci. Sect. Abstract Rev. 159,139 (1950)

"A (p-HOC₆H₄)₂CMe₂-formaldehyde resin plasticized with castor oil, a cresol-formaldehyde resin plasticized with tung oil, and a phenol formaldehyde resin plasticized with tall oil were tested for chemical resistance to 67 liquids." From Abstract Rev.

Elm, A.C.

A DISCUSSION ON THEORIES OF THE YELLOWING OF OILS
Paint Varnish Production Mgr. 1931, 30-2 (Sept., 1931)

The theories of Eibner, Morrell, Scheiber and others for the yellowing of dried oil films are compared but no final conclusion is reached.

Emmel, M.W.

TOXIC PRINCIPLE OF THE TUNG TREE.
Florida Agr. Expt. Sta. Bull. 431, 35 pp. (1947)

A saponin and another toxic substance have been isolated in the oil-free meal obtained from the kernels of the fruit of Aleurites fordii.

Engelbeen, M.

BASES FOR THE IMPROVEMENT OF ALEURITES MONTANA. (LOUR.) AT KIVU (BELGIAN CONGO).

Agricultura (Louvain) 46, 1-29 (Feb., 1948)*; Bibliog. of Agr. 12, No. 57, 146 (1948). Biol. Abstracts 23, 2267, Abs. No. 22,002 (1949)

English, Dutch and German summaries.

Ernst, R.C., and Eudaley, G.R.

EFFECT OF PIGMENTS ON OLFEORESINOUS FILM STRUCTURE. III

Paint, Oil Chem. Rev. 104 (23), 102-3, 114-5, 118-9; (24), 18,20 (1942); Official Digest Federation Paint & Varnish Production Clubs No. 221, 575-90 (1942)*; C.A. 37, 1280 (1943).

"After a discussion of the theory of the mechanism of film formation E. and E. describe the oil varnishes prepd. for this investigation; 4 general types were made as follows: (1) 16 gal. linseed oil with Bakelite and ester gum resins; (2) 33 gal. linseed oil with same resins; (3) 16 gal. tung oil with Bakelite and (4) 16 gal. castor oil with Bakelite. The pigments used were: TiO₂, BCWL, PbCrO₄, Fe₂O₃ and Cadmium Yellow. * * The substitution of pigment [for phenolic resin] brought about a decrease in the polymer content at failure with 2 exceptions: TiO₂ in tung-oil varnishes and 2PbCO₃.Pb(OH)₂ in linseed oil varnishes. The magnitude of these variations that occur when pigment is substituted for resin in amts. less than 50% dependent on the drying oil used in a varnish and its oil length. The variations were greatest for linseed oil, smaller for tung oil, and smallest for castor oil. *** (6) The pigments studied caused a decrease in the tensile strength (except with the tung-Bakelite varnishes) accompanied by an increase in the percentage elongation of the varnish films. * *" From C.A.

Ernst, R.C., and Lubbers, W.H.

A STUDY OF OLEORESINOUS FILM STRUCTURE.

Natl. Paint Varnish Lacquer Assoc. Sci. Sect. Circ., 629,
383-98 (1941); C.A. 36, 2433 (1942)

"* * With varnishes contg. sol. resins, dehydrated castor oil tends to promote true polymerization to the greatest degree, tung oil to a smaller degree and linseed oil still less. **"
From C.A.

Fahrion, W.

WOOD OIL AND ITS POLYMERIZATION.

Farben-Ztg. 18, 2418-20 (1913)*; C.A. 7, 4081 (1913)

"Largely a resume of S. von Schapring's dissertation, Karlsruhe, 1912, in which v. S. has recorded some results differing from F's (C.A. 7, 269) and the article is partly polemical. F. adheres to former statements, i.e. that oleic acid, and not an isomer is present with elaeostearic acid in the oil. The formula for elaeostearic acid (as shown by v.S.) is $\text{Me}(\text{CH}_2)_3\text{CH}:\text{CH}(\text{CH}_2)_2\text{CH}:\text{CH}(\text{CH}_2)_7\text{CO}_2\text{H}$ and agrees with that proposed by Majima (cf. Ber., 42, 674) although v.S. presents no proof that the acid is isomeric with linoleic acid. On heating elaeostearic acid at 200-50° in an atmosphere of N, v.S. obtained a mixt. of products having lower acid and I nos., (which disproves the work of Cloez, who claimed the production of an isomeric acid, elaeoleic acid, under similar conditions. F. claims that "mesomorphous isomerism" does not take place, and defends his work, showing that the polymerization of wood oil is largely analogous to that of linseed. With the exception that the n_D of heated linseed oil increases from 1.47 to 1.49 on heating to 300° while the n_D of wood oil decreases from 1.519 to 1.509 on heating to 250° (for 18 minutes in N), this anomaly is not explained." From C.A.

Fahrion, [W]

FATTY OILS IN THE LIGHT OF MESOMORPHOUS POLYMERIZATION.

Ber. 49, 1194-6 (1916); J. Chem. Soc. 110, I, 628 (1916)

Wood oil owes its distinctive properties to the fact that it largely contains eleostearic acid. F. criticizes the views of Kronstein regarding polymerization.

Fairchild, David

THE CHINESE WOOD-OIL TREE.

U.S. Bur. Plant Ind. Circ. 108, 7 pp. (1913)

The tung oil tree and its culture are briefly reviewed. The tree does best in the more moist parts of the Gulf coast region of the U.S. where it can be grown on cheap land with little care. Its frost resistance is fairly good. Experiments with single trees have been made and the establishment of acre plantations is now planned.

Fasig, E. W. (Am. Soc. Testing Materials)

CHINA WOOD OIL SPECIFICATIONS.

Paint, Oil, Chem. Rev. 74 (24), 10-11; (25), 10-11 (26) 10-11 (1922); 75 (1), 10-11; (2), 10-11 (1923)*; C.A. 17, 640 (1923)

"In attempts to draw up a standard specification for China wood oil, acceptable both to importers and consumers, criticism of the Am. Soc. Testing Materials specification (C.A. 14, 3804; 15, 3884) was invited from all interests. Replies, given in detail, indicate that the A.S.T.M. specifications, excepting the heat test, are fairly acceptable. The modified Browne heat test, if retained, should be supplemented by the open-dish Worstall test (C.A. 7, 269) in which the character of the solid polymerized gel, and its color, can be observed." From C.A.

Ferreyra Reynolds, L.

IMPORTANCE OF INTENSIFYING TUNG CULTURE.

Bolsa de Com. del Rosario. Rev. 33 (813), 13-4, 16 (Nov. 30, 1945)*; Bibliog. of Agr. 8, No. 13,659 (1946).

Flood, W.E.

SOME EXPERIMENTS IN LACQUERS CONTAINING CHINA WOOD OIL.

Thesis, Univ. Florida, 1928*

See Flood, W.E., and Booth, D.C., with Beisler, W.H. "China Wood Oil In Lacquer. I." Ind. Eng. Chem. 20, 609-11 (1928)

Flowers, J.

TO REPLACE VIRGIN TIMBER PEARL RIVER COUNTY (MISS.) TURNS TO TUNG NUTS, BEEF CATTLE.

Prog. Farmer, Miss.-Ark.-La. Ed. 61 (2), 34 (Feb., 1946)*;

Bibliog. of Agr. 8, No. 18,333 (1946).

Fonrobert, Ewald

THE PRESENT POSITION OF THE EUROPEAN PAINT AND VARNISH INDUSTRY.

Ind. Chemist 7, 186-8 (1931)*; C.A. 25, 3499 (1931) (no abstract)

Fonrobert, Ewald and Boller, E.

ON THE COOKING OF WOOD OIL

Paint Varnish Production Mgr. 36-7 (Dec., 1931)

Various cooking schedules and the properties of the oils obtained are discussed in this review. The best results are obtained by heating the oil quickly to 280°C. and then cooling it as quickly as possible.

Forbes, W.C., and Neville, H.A.

WIJS IODINE NUMBERS FOR CONJUGATED DOUBLE BONDS. INFLUENCE OF SAMPLE-REAGENT RATIO.

Ind. Eng. Chem., Anal. Ed. 12, 72-4 (1940): C.A. 34, 2195 (1940)

"Iodine nos. obtained by the Wijs method for systems contg. conjugated double bonds are strongly influenced by the excess amt. of reagent present. Data are presented to show this effect for the conjugated systems 9,11-linoleic acid, tung oil and dehydrated castor oil. Contrasting data show that the excess

of reagent is of slight importance for the isolated systems 9, 12-linoleic acid and 9,12, 15-linolenic acid and for raw castor oil." From C.A.

Freeman, A.F., Pack, F.C., and McKinney, R.S.

MOISTURE DETERMINATIONS ON TUNG FRUIT AND ITS COMPONENTS FOR CONTROL PURPOSES.

Oil & Soap 20, 203-4 (1943); C.A. 39, 1551 (1945).

"By means of a special dryer in which the sample is dried for only 5-15 min. in a blast of hot air (at 260°F.), H₂O in tung fruits, meal, kernels, seeds, and hulls can be detected sufficiently accurately for routine control purposes." From C.A.

Friend, J.N.

AN INTRODUCTION TO THE CHEMISTRY OF PAINTS.

Longmans, Green and Co., New York, 1910, pp. 123-126

White tung oil (cold pressed) and black tung oil (hot pressed) are obtained from the seeds of the tung trees of China and Japan. Chinese exports amounted to 19,653 tons (1900); 16,700 (1901); and 23,540 (1907). The press cake is poisonous and useful only for fertilizer and for the manufacture of black pigments. Tung oil gels on heating to 480°F., has a specific gravity of 0.932 to 0.941, an iodine equivalent of 155-166 and a saponification number of 190.0-200. Its use in varnishes has been patented but the author is uncertain of their commercial success.

Fritz, F.

LINOLEUM FROM SOLIDIFIED WOOD OIL

Kunststoffe 1, 1911, 423-4.

The use of tung oil in linoleums is reviewed and formulas reported in various patents are critically discussed. It can be solidified by (1) light (to a lard-like material), (2) blowing at 40-50°C. for 100 hours or (3) heating. The procedure of Knoche (Brit. pat. 12,054,1897) of heating tung oil with cork meal is impractical because of charring of the cork and the fire hazard. F. does not accept the claim of Kronstein (Ger. 180,621) that tung oil linoleum has higher alkali resistance than ordinary linoleum. Up to 50% of linseed, soybean, corn or castor oil can be added to tung oil without impairing its ability to gelatinize. To prevent spontaneous combustion and to stop the gelatinization of the oil at the right stage cold oil (e.g. linseed) is added to stop the reaction.

Fritz, F.

ON GELATINIZED WOOD OIL.

Seifenseider-Ztg. 1912, 616.

Two uses for gelatinized tung oil are the manufacture of linoleum and of cements. For the former F. recommends solidified wood oil (60), blown linseed oil (200), rosin (110), kauri copal (50) and castor oil (10). To make a cement agitate in a drum for 3 days the following: gelatinized wood oil (60 Kg), rosin (35 Kg.), manila copal (10 Kg), castor oil (2 Kg), and benzene (200 l.)

Fritz, F.

SOME EXPERIMENTS ON THE PREPARATION OF LINOLEUM FROM MATERIALS THAT HAVE NOT, AS YET, BEEN USED FOR THIS PURPOSE.
Kunststoffe 3, 21-2 (1913); C.A. 7, 1297 (1913).

Linoleum products made from tung oil have been variable in quality probably due to improper processing. An excellent sample was made from corkmeal (25), tung oil-whale oil (18), Peru ochre (8). A hard, brittle product was composed of seal oil (150), tung oil (10), Walton oil (840), colophony (180) and kauri copal (95).

Fritz, F.

SOME OBSERVATIONS ON THE GERMAN LINOLEUM INDUSTRY.
Kunststoffe 5, 49-50 (1915); C.A. 9, 1253 (1915)

"A brief review and discussion." From C.A.

Fritz, F.

THE USE OF CHINESE WOOD OIL FOR LINOLEUM MANUFACTURE
Chem. Umschau Fette, Oele Wachse u. Harze 31, 23-4 (1924);
C.A. 18, 1209 (1924)

"A review of the results with numerous expt. wood oil mixts. for the manuf. of linoleum, concluding with a recommendation for further expts. with the following mixt. which had produced excellent results: 90 kg. linseed oil and 10 kg. wood oil, oxidized with 2% litharge at 40°. The linoleum cement consisted of 1000 parts of this linoxyn, 200 of scum, 225 of rosin and 120 of kauri copal. The linoleum mixt. consisted of 25 parts cork flour, 18 linoleum cement and 8 Peru ochre." From C.A.

Fritz, F.

INFLUENCE OF COLD ON TUNG OIL.
Farbe u. Lack 1933, 105-6; C.A. 27, 2048 (1933)

"Solidification of tung oil takes place at about 0° and is accompanied by formation of a porous structure. Oxidation often occurs at the oil-air interfaces thus formed, with resulting deterioration of the oil. Oxidized oil does not freeze so readily as fresh oil. Note. Fr. Köhler. Ibid 106." From C. A.

Fritz, F.

DRYING OILS AND DRIERS.

Curt R. Vincentz, Verlaganstatt, Hannover, 1949, 96pp. (in German)

The section of this book devoted to tung oil reviews the origin, testing, properties and uses of this oil.

Fulton, R.A., and Howard, N.F.

EFFECT OF ADDITION OF OIL ON THE TOXICITY TO PLANT BUGS OF DERRIS AND OTHER INSECTICIDES.

J. Econ. Entomol. 31 (3), 405-10 (1938)*; Biol. Abstracts 12, 1125, Abs. No. 12,091 (1938)

"In laboratory tests the toxicity of derris, nicotine, nicotine sulfate and anabasine sulfate was markedly increased by addition of an oil emulsion, especially a peanut oil emulsion. Peanut oil, olive oil and teaseed oil were more effective against the squash bug, Anasa tristis, than oil of petrolatum, corn, tung and soybean oil." From Biol. Abstracts (abridged).

Gardner, H.A.

THE RARER PAINT OILS.

8th. Intern Cong. Appl. Chem. Sect. V^c., Orig. Commun. 12, 33-40: (1912)*; J. Soc. Chem. Ind. 31, 937 (1912)

"As showing the behaviour of the less common paint oils under practical (atmospheric) conditions, the results are given of tests in which wooden panels were coated with paints containing various proportions of these oils and exposed for twelve months. The pigment employed contained 20 per cent. of basic carbonate white lead, 30 of basic sulfate white lead, 35 of zinc oxide, 10 of magnesium silicate and 5 of barytes: the oils used are indicated in the following table in which the results of the exposures are also shown:-

[For vehicle No. 5, raw linseed (50%) plus treated Chinese wood oils (50%), G. Reported chalking, v. slight: checking, considerable: general condition, good: remarks, high gloss, very white."]

Gardner, H.A. (Am. Soc. Testing Materials, Comm. D-1, Sub-Comm, III)
STANDARDS FOR TUNG OIL

Paint Mfrs. Assoc. U.S., Circ. 100, 12 pp. (July 1920); C.A. 14, 3804 (1920)

"A report of Sub-Comm. III on Paint Vehicles, of Comm. D-1 on Coatings for Structural Materials, Am. Soc. Testing Materials. Cooperative tests on samples of tung oil, lead to a recommended revision of the present specification (C.A. 10, 974) from which the I jelly test is omitted and the Browne heat test is modified so that a glass cup 11 cm. in diam. is used in which 2 tubes are inserted, one contg. the sample and the other an oil of known purity. Tabulated results of tests show that more concordant results are obtained by the revized heat test, that as low as 5% soy oil in linseed can be detected; and they seem to indicate that most of the com. tung oils contain appreciable quantities of other oils." From C.A.

Gardner, H.A., et al (Sub-Comm. III of Comm. D-1 of Am. Soc. Testing Materials)

REPORT ON TESTING OF PAINT VEHICLES.

Am. Soc. Testing Materials Proc. 22, 1, 367-73 (1922); C.A. 17, 1338 (1923)

"Results of cooperative analyses on samples of chia, rubber-seed, sunflower-seed, and tung oils are tabulated. These indicate that the Wijs method for detg. I nos. gives accurate results on tung oil, being about 2 points lower than the I nos. by the Hubl method. The lime treatment of tung oils (C.A. 16,

768) before the heat test should be omitted. This test may be applied if the purity of the oil is under suspicion, but tung oil of suitable quality for the varnish industry should fall within the specification limits on the heat test, without neutralizing their acidity with lime." From C.A.

Gardner, H.A.

NOTES ON FURFURAL. ITS USE AS A PAINT AND VARNISH REMOVER. Paint Mfrs'. Assoc. U.S. Circ. 171, 140-7 (Feb. 1923); C.A. 17, 1336 (1923)

"Furfural alone or mixed with 20% of solvent naphtha is an effective paint and varnish remover. It has the advantage over most removers that it is less fire hazardous, evaps. more slowly, is less harsh on the skin, and leaves the surface free from wax and ready for subsequent painting. For use on vertical surfaces it may be thickened. Review of the manuf. of furfural, bibliography, and patents involving its use, are given. Illus." From C.A.

Gardner, H.A. (Am. Soc. Testing Materials. Comm. D-1, Sub-Comm. III)
REPORT ON PRESERVATIVE COATINGS FOR STRUCTURAL MATERIALS [AND]
ON TESTING OF PAINT VEHICLES.
Am. Soc. Testing Materials Proc. 23, I, 260-1 (1923); C.A. 18, 1207 (1924)

"***In the tentative specification for raw tung oil (Proc. Am. Soc. Testing Materials 22, I, 742), the min. d. is increased to 0.9400 and n₂₅ to 1.5165, and the max. acid no. to 8.0. An open-pan heat test is added as a quality test. Results of analyses by various operators on the same sample of commercial tung oil are tabulated." From C.A.

Gardner, H.A.

THE CULTURE OF TUNG TREES IN THE UNITED STATES.
Rev. Botan. App. et agr. coloniale 5 (41), 81-2 (1925).

Gardner, H.A. (Am. Soc. Testing Materials, Comm. D-1, Sub-Comm III)
REPORT OF COMMITTEE D-1 ON PRESERVATIVE COATINGS FOR STRUCTURAL MATERIALS.
Am. Soc. Testing Materials Proc. 25, 230-31 (1925);* C.A. 20, 1329 (1926).

Sub-committee III of Comm. D-1 (A.S.T.M.) recommends that the requirements for sampling which they have drawn up be added to the tentative specifications for raw tung oil (D12-12T). Samples shall be taken from a discharge pipe during transfer of the oil whenever possible. When that is not possible numerous small samples shall be taken by "thief" or special container from various levels in large tanks or from at least 10% of smaller containers. These small samples shall be composited and mixed before testing.

Gardner, H.A.

NOTES ON LEAD TUNGATE

Am. Paint Varnish Mfrs.' Assoc. Circ. No. 377, 133-4 (1931); C.A. 25, 2009 (1931)

"Pb tungate as a vehicle for quick-drying paints may be prepd. by adding 30 parts litharge or 35 parts basic Pb carbonate to 100 parts of tung oil fatty acids at 300°F. The paste so prepd. is thinned while hot, preferably with solvent naphtha. Pb. tungate so prepd. is sol. in a no. of common solvents while hot but gradually ppts. from these solns. on standing after cooling. Apparently its pptn. does not preclude its use in paints." From C.A.

Gardner, H.A.

IMPORTANCE OF TUNG OIL TO THE VARNISH INDUSTRY

Am. Paint J. 20, 18, 48, 50 (Oct. 21, 1935)*; C.A. 30, 306 (1936).

"The most likely material for replacing tung oil is the alkyd type of resin, but no oil or resin product at present exactly matches tung oil in all formulations, particularly in water-proof spar varnish. Oiticica and perilla oils may replace wood oil and linseed oil with fairly parallel results if the waterproof requirements of the varnish are not too rigid." From C.A.

Gardner, H.A., and Sward, G.G.

CONSTITUTION AND DRYING OF TUNG OIL

Paint, Oil Chem. Rev. 88 (22), 10-11 (Nov. 28, 1929)

Eleostearic acid has 3 double bonds in the 9:10, 11:12 and 13:14 positions.

Gardner, H.A., and Sward, G.G.

PHYSICAL AND CHEMICAL EXAMINATION OF PAINTS, VARNISHES, LACQUERS AND COLORS.

Distributed by Henry A. Gardner Laboratory, Inc., Bethesda, Md., Ed. 10, 652 pp., 1946.

Detailed procedures are given for carrying out tests on drying oils and other coating materials. Tests used only for tung oil include heat tests (Browne, Worstall, Bolton, and Paint Research Station), tests for the detection and determination of tung oil (Goldsmith, Scheiber, iodine, titanium, Wang, Suen-Wang, Leppert-Majewska), tests for β -eleostearin, and the tung oil test for lime. Tests used for tung and other drying oils include, refractive index, optical dispersion, bodying rate, etc. Both procedures and apparatus for determining the gas-proofness of tung oil varnishes are described.

Gascoigne, J.A.

THE CHOICE OF PAINT. III. SURFACE COATINGS TODAY. PAINT MEDIA. Ind. Finishing (London) 1, 709-12, 714 (1949)

A discussion of the preparation and properties of paint media and of the raw materials used for this purpose. China wood oil is one of the latter.

Gee, Geoffrey, and Rideal, E. K.

REACTIONS IN MONOLAYERS OF DRYING OILS. I. THE OXIDATION OF THE MALEIC ANHYDRIDE COMPOUND OF BETA-ELEOSTEARIN, Proc. Roy. Soc. (London) A153, 116-28 (1935) C.A. 30, 2024-5 (1936)

"The film spread on 0.01 N H_2SO_4 increased in area at const. pressure owing to oxidation. Fairly constant force-area and phase-boundary potential curves could be obtained by rapid examination. The limiting area A of the unaltered monolayer was observed to be $385 A.^2$ (calcd. $380A^2$), the elc. moment $\mu \times 10^{19}$ 25.4 e.s.u. (calcd. 24.8). Four stages of compression were noted to each of which structural configurations were assigned. At the end A was equal to $120A.^2$ and $\mu \times 10^{19}$ to 8.2. This state corresponded to submergence of the glyceride mol. and emergence of the outer double bond, both of which were originally in the same horizontal plane. The oxidation velocity varied considerably with pressure. The total increase in area was greater at the higher pressure. Conclusion: The film is oxidized to an unstable primary peroxide, which in turn undergoes polymerization or isomerization. The energy of activation of oxidation was 6500 cal./mol. and of isomerization 19,000 cal./mol." From C.A.

Gelber, E. TH., and Boeseken, J.

DETERMINATION OF IODINE NUMBERS. II. ACTION OF IODINE CHLORIDE SOLUTIONS ON THE FATTY ACIDS WITH CONJUGATED DOUBLE BONDS, Rec. trav. chim. 48, 377-85 (1929); C.A., 23, 3362 (1929)

"When Wijs' soln. is allowed to act upon linoleic acid dissolved in CCl_4 , a low I no. is obtained unless a large excess of reagent is used (about 400% of the theoretical quantity) and about 48 hrs., allowed for the reaction to take place. By dissolving linoleic acid in AcOH, by adding Wijs' soln. and pipetting off portions at different intervals, it was found that the reaction takes place in 2 stages: the first stage takes place instantaneously and gives an I no. of about 91, corresponding to the effect of 1 double bond; the second stage corresponds to the action of I on the second double bond and takes place so slowly that low results are obtained if the analysis is conducted normally. The explanation seems to be that linoleic acid in contact with ICl_2 takes up more Cl than I so that there is to a certain extent an accumulation of I in the reagent. In the case of eleostearic acid the formula proposed by Boeseken and Ravenswaay would call for an I no. of 270 whereas previous detns. have given 180; but in the light of the above facts, it is now possible to get as high a value as 272, so that the opinion is confirmed that eleostearic acid is a linolenic acid. Two double bonds react quickly but the third reacts very slowly with I. Apparently, the first reaction with ICl results in the formation of a tetrachloride, which then very slowly adds on an additional mol. of ICl ." From C. A.

Gilbert, S., and Lagasse, F.S.

ACCELERATING GERMINATION OF SEED IN WINTER.

Tung World 4 (1), 11, 17-8 (1949)

"A pre-planting cold-storage treatment of tung seed is believed to be the most satisfactory method of obtaining rapid and uniform germination of tung seeds. The treatment consists of at least one month's storage at 40 degrees to 45 degrees F. in wet wood shavings prior to planting." From the summary of the article.

Gilbert, S.G., Loustalot, A.J., and Potter, G.F.

STORING HULLED TUNG NUTS SAFELY.

Tung World 1 (10), 8-10, 17, 22 (Feb., 1947)

Tung nuts hulled in portable hullers must either have good air circulation in storage or else be artificially dried before storage.

Gilkin, W.

CHEMISTRY OF FATS, LIPIDS AND WAXES.

Gebrüder Borntraeger, Leipzig, 1913, Vol. 2 pp. 24-7

A brief summary of the properties and uses of tung oil.

Guinkul, S. G.

THE DEVELOPMENT OF TUNG TREE CULTIVATION IN THE U.S.S.R.

Soviet Subtropiki, No. 1, 74-82 (1934).

Gobbato, Celeste

CULTURE OF TUNG.

Vida Rural e Econ. 5 (8), 31 (Aug. 31, 1943)*; Bibliog. of Agr. 4, 8759 (1944)

Godoy Jr., Celeste

CONTRIBUTION TO THE STUDY OF TUNG CULTURE.

Esc. Super. de Agr. "Luiz de Queiroz." Anais 3 460-6 (1946)*; Bibliog. of Agr. 11, No. 13,821 (1947); Oleagineux 3, 292 (1948)

"Amounts of fertilizing elements removed from the soil by the culture of peanuts. Means of remedying this disadvantage: use as fertilizer of tung press cake, hulling fruit at the place and time of harvesting." Translated from Oleagineux.

Gohier and Jacob

THE CULTURE OF ALEURITES IN MADAGASCAR.

Rev. botanique Appl. et Agr. Coloniale 15 (165), 367-9 (1935).

Gonzales, E.L.

CULTIVATION OF TUNG (ALEURITES FORDII HEMSL.)

Campo (Buenos Aires) 28 (239), 52-3 (Mar., 1944)*; Bibliog. of Agr. 5, No. 1585 (1944)

Gordon, D.

UNIQUE PLANT PRODUCES TUNG AND PEANUT OILS.

Ghem. & Met. Eng. 52 (11), 106-7 (Nov., 1945); Bibliog. of Agr. 8, 3450 (1946).

The plant embodies a combination of features seldom if ever required of an oil processing plant, for it was engineered for the Continental Commodities Corp. of New York and is situated in the interior of the island of Madagascar. Tung or peanut can be processed from their raw condition through cleaning, pressing, and refining; electricity, steam, and even tin cans must be made on the scene of operation.

Greaves, J.H.

A COMPARATIVE EVALUATION OF DRYING OILS.

Paint. Manuf. 19, 111-2 (1949)*; C.A. 43, 4870-1 (1949)

"An evaluation of linseed oil substitutes and a discussion of the properties of alternative vegetable oils and synthetic drying oils. Included are: tung, stillingia, dehydrated castor, oiticica, fish, tall, soybean, tobacco seed, and styrenated oils." From C.A.

Green, T.G., and Hilditch, T.P.

OXIDATION OF SOME POLYHYDROXIC AND POLETHYLENIC HIGHER FATTY ACIDS BY AQUEOUS ALKALINE PERMANGANATE SOLUTIONS.

J. Chem. Soc. 1937, 764-7; C.A. 31, 5323 (1937)

"***The dibasic acids resulting from the degradation of α - and β -eleostearic acids by aq. alk. KMnO_4 consisted of approx. 80% azelaic acid and 20% I [suberic acid]." From C.A.

Greene, R.S.

TRADE OF THE YANGTZE RIVER PORTS, HANKOW.

Daily Consular and Trade Repts. (U.S. Dept. Com. and Labor)

No. 3, 49-57 (Jan. 4, 1913)

The value of the wood oil exported from Hankow to the United States was \$2,045,549 in 1910 and \$1,808,406 in 1911.

Greer, S.R.

FERTILIZERS FOR YOUNG TUNG TREES.

Mississippi Agr. Expt. Sta. Inform. Sheet 315, 1 pp. (1944)

Bibliog. of Agr. 6, No. 363 (1945)

Greer, S.R.

SUMMER LEGUMES WITH TUNG TREES IN SOUTH MISSISSIPPI.

Miss. Agr. Expt. Sta. Inform. Sheet 328, 1 pp. (1944)*; Bibliog. of Agr. 8, No. 188 (1946)

Greer, S.R.

FERTILIZING YOUNG TUNG TREES.

Mississippi Farm Res. 8 (6), 8 (June, 1945)*; Bibliog. of Agr. 7, No. 11, 257 (1945).

Greer, S.R.

FERTILIZING YOUNG TUNG TREES.

Miss. Agr. Expt. Sta. Inform. Sheet 345, 2 pp. (1945)*; Bibliog. of Agr. 8, No. 205 (1946).

Greer, S.R.

FERTILIZING YOUNG TUNG TREES.

Com. Fert. 71 (2), 17,36 (Aug., 1945)*; Bibliog. of Agr. 7, No. 21,781 (1945).

Greer, S.R.

WINTER LEGUMES WITH TUNG TREES.

Miss. Agr. Expt. Sta. Inform. Sheet 354, 2 pp. (1945)*; Bibliog. of Agr. 8, No. 5489 (1946)

Greer, S.R., and Ashley, T.E.

TUNG CULTURE IN SOUTHERN MISSISSIPPI

Mississippi Farm Res. 7 (10), 3-7 (Oct., 1944)*; Bibliog. of Agr. 6, No. 1276 (1945)

Greer, S.R., Ashley, T.E., Potter, G.F., and Angelo, E.

TUNG CULTURE IN SOUTHERN MISSISSIPPI.

Mississippi Agr. Expt. Sta. Bull. 409, 26 pp. (1944)

The culture of the tung tree is thoroughly reviewed under sections entitled: (1) Location of Orchard, (2) Soil Preparation, (3) Planting Stock, (4) Planting the Orchard, (5) Culture, (6) Fertilization, (7) Pruning, (8) Harvesting and Storing Tung Nuts. (Cf. Tung Culture in Southern Mississippi (Revised) by W.W. Kilby and G.F. Potter.)

Greer, S.R., and Beebe, C.E. (Beebe, C. E., and Greer, S. R.)

SUCCESSFUL TUNG FARMING.

Tung World Publishing Co., Gulfport, Miss., 1950*.

The planning, planting and care of tung orchards and the harvesting, hulling and marketing of the fruit. Reviewed in Tung World 5 (9), 6-7 (Jan., 1951)

Griebel, C., Zeisset, A., and Hecht, I.

TOXIC VEGETABLE OILS.

Deutsche Lebensm. Rundschau 43, 123-126 (1947)*; Oléagineux 4, 643 (1949). Brit. Chem. Abstracts 1948,A, III, 812.

"Toxic effect of the aleurites oils, probably due to the presence of eleostearin." Translated from Oléagineux.

Grisand, Jules

WOOD OILS

Bull. de l'office colonial, 49, 1-7 (Jan., 1912); Bull. Bur. Agr. Intell. 3, 938-40 (1912); C.A. 7, 1621 (1913)

"The fruit of the abrasin (*Aleurtes cordata* Stend.) contains 3 large seeds with kernels, which furnish abrasin oil, better known as tung or China wood oil, whose yield is 50-60% of the wt. of the kernels, or 20% of the whole seeds. This oil is limpid, colorless and nearly solid when cold, but reddish yellow and viscid when hot. It is used for protecting wood, Fe and ropes from damp. In China and Japan it is used for ordinary painting. It may be used for lighting without any prep.

When suitably prepared it can be used as utty in glazing, as a varnish, and for soap making. It is used for skin diseases and for warming the surface of the body after asphyxiation. Further, it is a strong insecticide." From C.A.

Groot, E.H., Kentie, A., and Knol, H.W.

VACCENIC ACID.

Rec. trav. chim. 66, 633-8 (1947) (in English); C.A. 42, 2232 (1948)

Vaccenic acid has been prepared from partially hydrogenated tung oil.

Gruen, F.H.

TUNG NUTS.

Agr. Gaz. N.S. Wales 59, 320-1 (June 1, 1948)*; Bibliog. of Agr. 12, No. 68,624 (1948).

Guillen, P.V.M.

TUNG.

Campo (Buenos Aires) 30 (352), 62-5 (Feb., 1946)*; Bibliog. of Agr. 10, No. 7891 (1947).

Gutiev, G.T.

FROST RESISTANCE OF TUNG OIL TREE (ALEURITES FORDII)

Doklady Vsesoyuz. Akad. Sel'sko-Khoz. Nauk im. V.I. Lenina (Lenin Acad. Agr. Sci. U.S.S.R.) 15, 22-5 (1950)(in Russian)*

D., H.

THE CULTIVATION OF THE TUNG TREE IN THE U.S.S.R.

Bull. Imp. Inst. 46, 57-61 (1948); (Abstract) Oleagineux 4, 643 (1949)

In spite of unfavorable ecological conditions the acclimatization of the tung tree has been achieved. See also D.,H. (p.75) and Tkatchenko (p. 24)

Hadert, Hans

COATINGS FOR RUBBER GOODS.

Farbe u. Lack 56, 447-9 (1950)*; C.A. 45, 878 (1951)

"Coatings to improve the color, gloss, wear, or feel of rubber goods must be specially formulated in view of possible effects on them by ingredients of the rubber mix (softeners, resins, pigments, accelerators, antioxidants), must dry rapidly or during the vulcanization treatment, and must have high permanent elasticity, gloss, adhesion, mech. strength, and weather resistance, good color stability, and must lack tackiness. Cu equipment must not be used in their manuf. Overshoe varnishes are made from drying oil (linseed, wood, or stand oil) or from sulfurized oil (e.g. linseed oil blown to d. 0.960-5 and treated with 4-10% S at 150-60°), rosin or synthetic resins, gilsonite, and oil black. * * " From C.A.

Hamilton, J., and Gilbert, S.G.

A SIMPLIFIED METHOD FOR DETERMINING THE OIL CONTENT OF TUNG KERNELS.

Proc. Am. Tung Oil Assoc. 1947, 1-3

A new method for determining the oil content of tung kernels consists of disintegrating flaked or ground kernel material in a hydrocarbon solvent in a Waring Blender and then determining the amount of oil in the resulting solution. (Cf. Anal. Chem. 19, 453-6 (1947)).

Hansen, P.L.

OIL CROPS IN AMERICAN FARMING.

U.S. Dept. Agr., Tech. Bull. 940, 55 pp. (Nov., 1947)

Statistics on production and use of domestic oils including tung oil.

Hasperue, J.C.

THE FUTURE OF THE CULTURE OF "TUNG"

Rev. de Econ. Argentina 44, 519-24 (Nov., 1945)*; Bibliog. of Agr. 9, No. 4694 (1946)

Hawkins, L.A.

ORCHARD TILLAGE.

Proc. Am. Tung Oil Assoc. 1947, 82-5

A review of purposes and methods of cultivating tung orchards.

Hayter, C.N.

TUNG NUT GROWING.

Rhodesia, South. Dept. Agr. and Lands. Bull. 1408, 3 pp. (1947)*; Bibliog. of Agr. 12, No. 7810 (1948)

Hearin, J.B.

CATTLE AID FARMERS ON TUNG LOANS

Tung World 1 (2); 5 (June, 1946); Bibliog. of Agr. 10, No. 11, 934 (1947)

Heckel, G.B.

FIRE HAZARD OF THE NEWER "DRYING" OILS.

Natl. Fire Protection Assoc. Quart. 12 (3), 283-4 (January, 1919)*; Hennefrund, H.H., and Colvin, E.M. (Comp.) The Soybean Industry (Agr. Econ. Bibliog. 74). U.S. Bur. Agr. Econ., Washington, D.C., 1938, P. 77

"Soy, perilla, tung, fish or menhaden oils are 'as to their status as 'risks', on the same footing as linseed oil'".

Heim, R., and Bouriquet, G.

A CANKEROUS AILMENT OF ALBURITES IN MADAGASCAR.

Rev. path. vegetale entomal agr. France 27, 3-13 (Jan., 1948)*; Bibliog. of Agr. 12, No. 55,429 (1948).

Heller, H.

DIFFERENCE BETWEEN CHINESE AND JAPANESE WOOD OIL.

Farbe u. Lack 1925, 76*, Chem. Zentr. 1925, I, 1922-3.

The properties of the two oils are compared. Differences were small.

Hemsley, W.B.

THE WOOD-OIL TREES OF CHINA AND JAPAN.

Roy. Botan. Gardens, Kew, Bull. Misc. Inform. 1914 (1), 1-4.

Taxonomic comparisons of Alseurites fordii, A. montana and A. cordata.

Henry, A.

THE WOOD-OIL TREE OF CHINA.

Am. Druggist Pharm. Record 32 (2), 33-4 (Jan. 25, 1898)

Varieties of the wood oil trees, various names for the oils, and their properties are reviewed. Reference is made to chemical studies reported by Cloez, Davies and Holmes.

Henry, A.

CHINESE WOOD OIL.

Paint, Oil Chem. Rev. 38, 41 (Oct. 5, 1904)

A note on the origin, properties and uses of wood oil. Reference is made to "The Wood Oil Tree of China" by A. Henry (Am. Druggist, 32 (2), 33-4 Jan. 25, 1898)

Hice, J.O.

THE TUNG OIL INDUSTRY AFTER THE WAR.

Am. Paint J. 28 (42), 54, 56, 58, 60, 64 (July 17, 1944)*;

Bibliog. of Agr. 5, No. 14,950 (1944)

Hilbert, G.E.

IMPROVED PROCEDURE FOR ANALYZING TUNG FRUIT AIDS INDUSTRY.

U.S. Bur. Agr. Ind. Chem. 1942/49, 15 (1949) Report of the Chief

A new analytical procedure for the determination of the oil in tung fruit has been proven to be accurate and dependable. Fairly large samples of whole fruit are ground and portions of the ground material are extracted with solvents. Other research on the grinding and processing of tung fruit is mentioned.

Hinkul, G.G.

ALSEURITES CORDATA R. BR., A. FORDII HEMSL. AND A. MONTANA WILS.

Bull. Applied Botany, Genetics Plant Breeding, (U.S.S.R.)

Series X, No. 2, 1935*

Ho, Kai, and Liu, Hu.

THE TUNG TREE AND TUNG OIL

Hankow Bur. Inspection & Testing of Com. Commodities, Ministry of Ind. (China), Bull 1, 99 pp. (1934). C.A. 29, 362 (1935)

"Analyses and figures on production." From C.A.

Ho, Kai, Wan, C.S., and Wen, S.H.

THE DETERMINATION OF THE IODINE NUMBER OF TUNG OIL. II. EFFECT OF TIME, CONCENTRATION AND TEMPERATURE.

Chem. Ind. (China) 10 (1), 43-60 (Jan., 1935)*

Ho, Kai, et al.

DETERMINATION OF THE IODINE NUMBER OF TUNG OIL.

Chemistry (China) 2 (3), 453-70 (July, 1935) (in Chinese)*

Hoehne, F.C.

OBSERVATIONS OF THE CULTURE OF TUNG.

São Paulo (State). Sec. da Agr., Indús. e Com. Dir. de Publicidade Agr. Notas Agr. 6, 302-5 (1943)*; Bibliog. of Agr. 4, No. 23,459 (1944)

Hoffman, L.

CHINESE WOOD OIL.

Seifensieder-Ztg. 35, 169-70 (1908)*; Chem. Zentr. 1908, I, 1339.

The authors describe the production, properties and uses of the oil.

Hollihan, J.P.

A VISCOSITY STUDY OF PARTICLE SHAPE AND SOLVATION FACTORS INVOLVED IN THE HEAT BODYING OF TUNG OILS.

Minn. Univ. Sum. Ph. D. Theses 3, 12-5 (1949)*

Holmes, E.M.

NOTES ON SOME JAPANESE OILS.

Pharm. J. 18, 636-7 (Oct. 7, 1885)

A sample of wood oil from Japan, attributed to Elaeococca cordata (or as Bentham recommends, to Aleurites cordata), has been examined. It possesses a high density and dark color like that reported by Davies for Chinese wood oil (this J. p. 634-6 (1885)). Properties are compared with those reported by Cloez (Comptes rend. 81, 469 (1875)).

Holmes, R.L., McKinney, R.S., and Minor, J.C.

THE EQUILIBRIUM MOISTURE CONTENT OF TUNG FRUIT AND ITS COMPONENTS AT DIFFERENT RELATIVE HUMIDITIES.

J. Am. Oil Chemists' Soc. 28, 218-20 (1951)

Holmes, R.L., and Pack, F.C.

PROGRESS REPORT ON DRYING AND STORAGE OF TUNG SEEDS.

Proc. Am. Tung Oil Assoc. 1947, 1-11.

The experimental data of this paper was supplemented by further research and reported in "Effect of Drying and Storing Tung Seeds on Quality of the Oil and Milling Characteristics of the Seeds" by Holmes, R.L., Pack, F.C., and Gilbert, S.G. (J. Am. Oil Chemists' Soc. 24, 311-4 (1947))

Holmes, R.L., and Pack, F.C.

THE PURCHASE OF TUNG FRUIT ON THE BASIS OF DRY KERNEL CONTENT.

Proc. Am. Tung Oil Assoc. 1947, 24-7

"This paper is a study of the accuracy of calculating the oil content of tung fruit from the percent dry kernels and the average oil content of dry kernels."

"The extreme averages for groups of samples (each group limited to a restricted locality for one year) * * * were 61.99% and 68.75% for oil in dry kernel, although individual samples varied more widely. The average kernel content of dry fruit is about 33%."

"While Table I shows this method of determining the oil content of fruit to be fairly reliable, the purchase of large amounts of tung on a dry kernel basis without checking upon the oil content of dry kernels for that particular location and year would seem an unnecessary risk--at least, until more is known about the variation of oil content of kernels. For large amounts of tung, enough samples (10 or 20 taken at random from a plantation) should be carefully analyzed for the per cent oil in dry kernels, and the average of these analyses used to calculate the oil content of the fruit from the dry kernel content. For smaller lots of tung, an average for that area could be used." Excerpts from the article.

Holmes, R.L., Pack, F.C., and Gilbert, S.G.

EFFECTS OF DRYING AND STORING TUNG SEEDS ON QUALITY OF THE OIL AND MILLING CHARACTERISTICS OF THE SEEDS.

Proc. Am. Tung Oil Assoc. 1946, Pt. 2, 18-31; C.A. 42, 386 (1948)

The same article was also published in J.Am. Oil Chemists' Soc. 24, 311-4 (1947). C.A. 41, 7135-6 (1947).

Hopkins, F.W.

A PHENOMENON TO BE CONSIDERED IN THE STORAGE OF CHINA WOOD OIL.

Am. Paint Varnish Mfrs'. Assoc. Circ. 297, 28-31 (1927); C.A. 21, 658 (1927)

"A description of the formation of the solid β -eleostearin modification; theoretical explanations are offered." From C.A.

Horn, L.J.

ENGINEERING IMPROVES OUTPUT OF FLORIDA TREES. MORE ECONOMIC AND EFFICIENT PROCESSES WILL GIVE NEW FOREST PRODUCTS AND BETTER TUNG OIL.

Florida Grower 56 (4a), 10 (Apr., 1948)*; Bibliog. of Agr. 12, No. a 38,336 (1948)

How, Bang

POST-WAR OUTLOOK FOR THE TUNG OIL INDUSTRY

Am. Paint J. 28 (35), 24-5, 54,56-7 (May 29, 1944)*; Bibliog. of Agr. 2, No. 4848 (1944)

Howes, F.N.

VEGETABLE SOURCES OF DRYING OILS.

Research (London) 2, 63-73 (1949)

A general review of the production and marketing of drying oils,

including tung oil (from Aleurites fordii and A. montana), linseed, oiticica, conophor, poppyseed, walnut, hemp seed, candle nut, perilla, lallementia, castor, safflower, stillingia, Garcia nut-
ans, etc.

Hrabe, K.

TUNG OIL AS A RAW MATERIAL FOR THE MANUFACTURE OF LACQUERS.
Chem. Obzor 16, 7-10 (1941)*; Chem. Zentr. 1941, II, 670;
C.A. 36, 3688 (1942)

"A review is given of the production, properties, chem. and phys. consts. of tung oil. Work on the use of tung oil as a base for the manuf. of lacquers is summarized, and formulas are given for such lacquers." From C.A.

Hsu, Hsien-Liang, Osburn, J.O., and Grove, C.S., Jr.

PYROLYSIS OF THE CALCIUM SALTS OF FATTY ACIDS.

Ind. Eng. Chem. 42, 2141-5 (1950); C.A. 45, 880-1 (1951)

"Ca soaps were cracked at 600-1000° F. and atm. pressure and the products analyzed. The cracked distillate was fractionally distd. and the fractions were analyzed. Tung oil Ca soaps gave 48.6% residual coke and 41.5% distillate contg. 25.8% aromatics. Ca stearate gave 17.3% residual coke and 76% distillate contg. 4.4% aromatics. A reaction mechanism is proposed. 50 references." From C.A.

Hubbard, J.

TUNG OIL AS AN INVESTMENT OPPORTUNITY.

Pub. by Mississippi Tung Oil Corp., n.d. 28 pp.*

Hunter, A.O.

THE TUNG INDUSTRY IN RIO GRANDE DO SUL.

Hacienda 39, 92 (Feb., 1944)*; Bibliog. of Agr. 4, No. 16, 113 (1944)

Hurst, G.H.

PAINTERS' COLOURS, OILS AND VARNISHES

Charles Griffin & Co., Ltd., London, 1906, pp. 374, 403-5.

A brief review. Tung or Chinese wood oil is obtained from the seeds of Elaeococca vernicia which grows in China. Its physical and chemical properties (including drying behavior) are reviewed. It contains elaeomargaric acid, $C_{17}H_{30}O_2$.

Ingle, H.

SOME NOTES ON LINSEED AND OTHER OILS.

J. Soc. Chem. Ind. 30, 344-5 (1911); C. A. 5, 2004-5 (1911).

An iodine value for tung oil is reported to be 168.

Jumelle, H.

THE CHINA WOOD OIL TREE IN MADAGASCAR.

Agron. Coloniale, 17 (125), 149-53 (1928).

Jackson, Donald

MARKETING RESEARCH IN FATS AND OILS BRANCH OF PRODUCTION AND
MARKETING ADMINISTRATION IN RELATION TO TUNG.

Proc. Am. Tung Oil Assoc. 1949 (2), 40-7

A review of the economics of the milling of tung fruit and the marketing of tung oil being started by the Fats and Oils Branch, Production and Marketing Administration, U.S. Dept. of Agriculture.

Jezek, R.E.

GATHERING, FIELD HULLING, AND STORAGE OF TUNG NUTS.

Proc. Am. Tung Oil Assoc. 1947, 65-8

It is estimated that 23 man-hours of labor per ton is required to pick up fruit by hand, bag them, hang bags in trees and transport bags to mill. Mechanical gathering, field hulling and transportation of the nuts to mill requires only 9 man-hours. Comparative drying behavior are reported for whole fruit in bags, hulled nuts in bins and hulled nuts in bags.

Jezek, R.E.

SOME FACTORS AFFECTING TUNG NUT DRYING.

Agr. Eng. 29, 545-7 (Dec., 1948)

Whole tung fruit were dried by storage in bags and in ventilated bins. Forced circulation of heated air (120°F) was recommended.

Jezek, R.E.

PROGRESS IN MACHINERY FOR PICKING UP AND FIELD HULLING TUNG FRUIT.

Proc. Am. Tung Oil Assoc. 1949 (2), 18-24.

"The principle using the flexible sweeping rake has been developed and proven. Tests show that this principle is effective, even under adverse conditions. It is to be remembered that the machine discussed is still in the experimental stage. A field machine of this type must necessarily be strongly constructed and protected against excessive wear.

The roll separation works very well under most conditions and it is definitely an improvement for field hullers. It replaces the fan and vibrating screen, thereby simplifying the huller and its operation. Continuous operation of the huller is made possible because the adjustment of the roll separators is not critical and it does not have to be level to operate effectively. Less power is required for this type of separation. After overcoming a few minor difficulties, the first portable hullers placed on the market are doing a good job." Summary of the article.

Jezek, R.E., and Reed, I.F.

MACHINERY TO HARVEST AND HULL TUNG NUTS IN THE FIELD.

Proc. Am. Tung Oil Assoc. 1946, (1), 37-9

A progress report on the development of a mechanical tung fruit harvester. A machine utilizing revolving rakes has shown promise in laboratory tests. Hullers of the type designed by the authors are in commercial use.

Johnson, R., and Yarnell, H.

CULTURE OF ALEURITES IN TEXAS.

Rev. botan. appl. et agr. trop. 16 (180), 647-9 (1936).

Jordan, L.A.

TUNG OIL.

J. Oil & Colour Chemists Assoc. 12, 113-53 (1929) C.A. 23, 4087 (1929)

"A review. Tung trees, principally A. fordii and A. montana, have been known outside of China since 1760, were introduced into America in 1896, Germany in 1897 and England soon after. Expts. on cultivation outside of the native habitat have progressed most rapidly in Florida. Nearly every part of the British Empire has been tried. The most promising part of the latter seems to be the Kenya, Middle East Africa. A complete bibliography is appended." From C.A.

Jordan, L.A.

TUNG OIL PARTICULARLY REFERRING TO THE POSSIBILITIES OF PRODUCTION WITHIN THE BRITISH EMPIRE, WITH BIBLIOGRAPHY OF THE LITERATURE.

J. Soc. Chem. Ind. 48, 847-55 (1929); C.A. 23, 5599 (1929)

"Early in 1928 there was crushed 30,000 lb. of seed, mostly from the Florida plot. The best results were obtained with the Anderson expeller. Extn. processes were unsatisfactory. Tests of the product by consumers show it to be satisfactory. Since 1927 trial plots have been grown in Middle East Africa, India, Ceylon and New Zealand, some of which are promising." From C.A.

Jung, H.G.

CHINA WOOD OIL REVIEW, 1946-1947

Proc. Am. Tung Oil Assoc. 1947, 76-81

A review of factors influencing the importation of wood oil from China and explanations for the present weak market for the oil.

Kametaka, Tokuhei

THE COMPOSITION OF SO-CALLED ELAEOMARGARIC ACID.

J. Chem. Soc. 83, 1042-5 (1903); Chem. Zentr. 1903, II, 657.

1. The principal organic acids of the oil of Elaeococca vernicia are a solid acid, m.p. 43-44°, and ordinary oleic acid, the former predominating.

2. The solid acid, which Cloez named elaeomargaric acid, and for which Maquenne recently proposed the name α -eleostearic acid, has the composition $C_{18}H_{32}O_2$ and not $C_{17}H_{30}O_2$, as calculated by Cloez, or $C_{18}H_{32}O_2$, as given by Maquenne.

3. The solid acid is, undoubtedly, a stereoisomeride of linolic acid, the bromine additive product, $C_{18}H_{32}O_2Br_4$, as well as the oxidation product, $C_{18}H_{32}(OH)_4O_2$, obtained from the former, agreeing in every respect with those obtained from the latter." From the summary of the article.

Kappelmeier, C.P.A.

OITICICA OIL AND ITS FUNDAMENTAL DIFFERENCE FROM TUNG OIL.

Paint Vernish Production Mgr. 14, 7-8, 10 (June, 1936); C.A. 30, 5433. (1936)

"The most important structural unit in oiticica fat is couepic acid, not an isomer of oleostearic acid as claimed by some. Couepic acid is a keto acid with 3 double bonds in conjugated position. The highly unsatd. acid from oiticica fat was isomerized by sunlight in the presence of catalytic traces of I. The product was not identical with beta-oleostearic acid. Hydrogenation was selective with this product and yielded a keto acid ($C_{18}H_{34}O_3$). The esters of beta-couepic acid are less stable than their K salts, but more stable than the free acid. The esters have a peculiar type of instability and gelation begins at the surface and penetrates to the interior of the fat, causing complete spoiling of the fat in a few months (as far as use for paint and varnish is concerned.) The properties of oiticica fat are listed and the prepn. and properties of beta-couepic acid and the salts. It appears that alpha- and beta-couepic acids are identical with the licanic and isolicanic acids. Hexahydrocouepic acid is not stearic acid but a ketostearic acid probably with the keto group in the gamma position." From C.A.

Kaufmann, H.P. and Baltes, J.

THE FIELD OF FATS. XLV. DETERMINATION OF THE HYDROGEN-IODINE NUMBER (HYDRIER-JODZAHL) AND ITS USE IN THE ANALYSIS OF ESSANG OIL.

Ber. 70B, 2537-44 (1937); C.A. 32, 1958-60 (1938)

"In the investigation of oiticica oil, the detn. of the I no. presents difficulties because of enolization of the licanic acid present, and in other conjugated unsatd. fat acids the usual I-no. methods also fail. With oleostearic acid or wood oil an end point can be obtained only under certain conditions (use of Br in CCl_4 in the dark) and it corresponds to the unsatn. of only 2 of the 3 double bonds. But even this method is not applicable to licanic acid; hence there is available no method based on addn. of halogen for detg. the degree of unsatn. of this acid or of oils in which it is present. Detn. of the diene no. is an advance but gives only the conjugated unsatd. fat acid and there is required, in addn., a const. which will show all the double bonds present. Addn. of H in the presence of a catalyst offers a solution of the problem. Such a procedure for the analysis of fats is known but because of difficulties in app. and in carrying out the detns. it has not found wide ap- in practice. The authors have now devised an app. which is relatively simple and permits **series** detns. in the plant lab. The const. for the addn. of H to fats has been designated by various names, such as hydrogenation no., H no., etc. Since it has become customary, in the enometry of fats, to refer the consumption of reagent employed (Br, $(SCN)_2$, etc.) to I, it is

proposed to express the amt. of H used in terms of I and call the const. the hydrogenation-I no. (Hydrierjodzahl, HJZ). The app. consists of a 50 x 25 x 15 mm. hydrogenation chamber to an upper corner of which is sealed an extension with ground-glass joint; from the extension a side arm for the introduction of the sample to be hydrogenated projects downward. The extension is attached through the ground-glass joint with 2 capillaries and a 3-way stopcock which permits of making connection with the outside air, a vacuum pump or a 10-cc. H buret, the lower end of which is connected with a leveling bulb. The whold app. is fastened on a shaking panel. Glacial AcOH is used as solvent and one of the Pt-silica gel preps. of the Membranfilter-G.m.b.H. as catalyst. On the bottom of the hydrogenation vessel is placed 10-20 mg. of the catalyst, exactly 2 cc. of AcOH is introduced from a pipet having a long slender tip, 20-40 mg. of the fat (depending on its probable HJZ) in an 8 x 2.5 mm. weighing tube is slipped into the side arm, the hydrogenation chamber is connected with the rest of the app. through the ground-glass joint, the buret is filled with Hg up to the 3-way stopcock, the hydrogenation chamber is filled with H by alternately evacuating it to about 20 mm. and passing in H, the buret is likewise filled with H by turning the stopcock and slowly lowering the leveling bulb, connection between the hydrogenation chamber and the buret is established, the solvent and catalyst are satd. with H by shaking 0.5 hr. under 20-30 mm. overpressure, the hydrogenation chamber is turned through an angle of 180° which causes the weighing tube contg. the sample of fat to slide down into the chamber, and the app. is shaken under about 30 mm. overpressure, until no more H is absorbed (1-2 hrs.). Below are the results obtained with a no. of pure fat acids and fats (calcd. values in parentheses): linolenic, 268.3-8.9 (273.7); linolic, 180.2-1.8 (181.2); B-licanic, 258.7-9.3 (260.6); elaidic, 87.9-8.1 (89.9); linseed oils, 160.2-1.0, 173.8-4.5; oiticica oils, 201.5, 202.4; total fat acids of oiticica oils, 211.2-11.3, 212.8; essang oils, 176.2-6.9, 175.4. The hydrogenation depends greatly on the solvent. It proceeds most rapidly in glacial AcOH, although this solvent is not wholly satisfactory. Fats with a high proportion of satd. constituents are difficultly in sol. in AcOH and as the hydrogenation progresses satd. glycerides and fat acids sept., and although the reaction generally goes to completion it proceeds more slowly than it would in a homogeneous soln. Special attention must be given to the exclusion of contact poisons, among which are the mucilaginous and other unsaponifiable substances often present in impure fats; such fats should be first purified with fuller's earth. The app. affords an excellent means of following the course of H absorption, which is especially useful in the study of selective hydrogenation. Oiticica oil has not yet been analyzed by this method because the com. samples available already contained small amts. of polymerized components, which, even when present to the extent of only a few per cent, interfere with the analysis

in an uncontrollable way. In this paper are reported the results obtained on essang oil, from Picniodendron africanum, which is very similar in properties to Chinese and Japanese wood oils. Steger and van Loon (C.A. 30, 1597) report, as main constituent of the oil, α -eleostearic acid, along with linolenic, linolic, oxalic and satd. acids. They were unable to detect linolenic acid as hexabromostearic acid, but concluded it was present from the "true I no.," the SCN no. and the I no. detd. according to Kaufmann. K. and B. have doubts as to the applicability of the last method to essang oil. The addn. of Br does not stop with the satn. of 2 double bonds in eleostearic acid but increases with time without reaching a definite satn. point. much more satisfactory is the detn. of the part I no. (TJZ) with Br-CCl_4 in the dark, in which only the 2 double bonds of eleostearic acid are satd. while the other fat acids are completely satd. Petr.-ether extn. of individual seeds of R. Africanum gave 15.4-18.5% fat in seeds with the hulls and 40.3-49.8% in the shelled seeds; 1.5 kg. of the unhulled ground seeds yielded 250 g. of golden yellow oil. Forty g. of the total fat acids, prepd. with special precautions from the oil, was dissolved in 150 cc. petr. ether and cooled; α -eleostearic acid, m. 48° after crystn. from acetone, sepd. From the soln. of this acid in petr. ether, after addn. of a particle of I and exposure to ultraviolet light, the β -acid, m. 72° , crystd. out. To remove the last traces of eleostearic acid, the petr. ether was evapd. and the residue was taken up in 50 cc. benzene, treated with 10 g. maleic anhydride and heated 20 hrs. at 100° . After removal of the excess of anhydride with hot water and evapn. of the benzene, the residue was taken up in petr. ether (in which the addn. product of α -eleostearic acid is practically insol.) and evapd. A portion of the residue brominated in ether gave no ppt. of hexabromide, indicating that there was no, or very little, linolenic acid in the oil. After washing out the excess of Br, the ether soln. was evapd. and treated with much petr. ether, which pptd. tetrabromostearic acid, m. 114° after crystn. from ligroin, showing the presence of linolic acid in the fat. Oleic acid was detected by elaidination after removal of the eleostearic acid. From the consts. VZ (sapon. no.) 193.1, HJZ 176.2, TJZ 137.1, RhZ 80.1, DZ 41.2, the compn. of the oil is calcd., by means of equations given elsewhere (see below), to be as follows (1st value calcd. from TJZ, RhZ, DZ and unsaponifiable; 2nd value from HJZ, RhZ, DZ and unsaponifiable): eleostearic 45.1, 45.1; linolic 17.4, 15.1; oleic 25.7, 28.0; satd. acids 6.4, 6.4, unsaponifiable (petr. ether) 0.9, 0.9; glycerol residue 4.5, 4.5. The Bertram method gave 8.8% satd. acids." From C.A.

Kaufmann, H.P. and Baltes, J.

TH. FIELD OF FATS. XLVI. CALCULATION OF THE COMPOSITION OF FATS FROM THEIR CONSTANTS.

Ber. 70B, 2545-9 (1937); C.A. 32, 1960 (1938)

"A summary of the equations for calcg., in those cases most frequently occurring in practice, the content in eleostearic, licanic, linolenic, linolic, oleic and satd. acids, unsaponifiable and glycerol residue, from the characteristic nos. (hydrogenation I, I, part I, SCN and diene nos.)" From C.A.

Kaufmann, H.P., Baltes, J., and Berger, R.

MOLECULAR ENLARGEMENT IN UNSATURATED FAT ACIDS AND THEIR ESTERS AS A BASIS OF THE DRYING PROCESS AND THE PREPARATION OF SURFACE COATINGS. IV. INFLUENCE OF OXYGEN ON THE FILM FORMATION OF DRYING OILS.

Fette u. Seifen 52, 276 (1950)*; C.A. 44, 11,117 (1950); J. Am. Oil Chemists' Soc. 28, 79 (1951)

"The large amount of oxygen needed for film formation in drying oils is large enough to rule out the possibility that oxygen acts only as a catalyst. In practical use tests, films were not formed unless a large amount of air was present. The amount of oxygen necessary to form a hard elastic film of China wood oil is 3-4 moles per mole of glyceride. If the diene syntheses takes place they are only secondary reactions." From J. Am. Oil Chemists' Soc.

Kawawakami, K., and Miyayoshi, H.

THE ABSORPTION SPECTRA OF FATTY OILS IN THE ULTRAVIOLET REGION. J. Agr. Chem. Soc. Japan 17, 856-62 (1941)*; Bull. Agr. Chem. Soc. Japan 17, 102 (1941) (in English)*; C.A. 45, 882 (1951)

"Vegetable fatty oils (Chinese tung, boiled, perilla, linseed, poppy-seed, sunflower, soybean, kaoliang bran, cottonseed, sesame, almond, kenaf, ochra, castor, olive, and peanut oils) showed similar absorption spectra. The variations were very small, and the maxima were coincident with those of eleostearic acid and of a new fatty acid obtained by Moore (C.A. 31, 4517) from linseed oil by alkali treatment. The absorption was interpreted as due to the conjugated double bonds, because linseed oil, freed from them by treating the oil with maleic anhydride, showed only faint absorption (an effect of OH, which might react with maleic anhydride, was proved not to exist). The cause of absorption was not a single chromophore. The supposition of Bradley and Richardson (C.A. 34, 6833) that these absorptions were due to conjugated triene is denied, because dehydrated ricinoleic acid without conjugated triene showed distinct absorptions. A correlation between the extinction coeffs. of the absorption maxima and the drying character of fatty oils was noted, with some exceptions." From C.A.

Kenmuir, J.

TUNG OIL IN THE UNITED STATES.
Rev. botan. appl. et agr. trop. 14 (152), 310 (1934).

Kern, W.

ELEMENTARY REACTIONS IN THE DRYING OF OILS.

Farben, Lacke, Anstrichstoffe 4, 242-249 (1950)*; Fette u. Seifen 53, 51 (1951)(abstract); C.A. 44, 9696 (1950).

A study of the reactions (initiation, chain reaction, chain termination) involved in the drying of oils of the linseed and the tung oil types.

Kaing, S.H.

MANUAL ON OIL-PRODUCING CROPS.

China Agricultural Book Co, Shanghai, China (1937?) (in Chinese)*

Kilby, W.W.

FERTILIZER AND COVER CROPS FOR TUNG TREES.

Miss. Farm Research 9 (11), 2 (Nov., 1946)*; Bibliog. of Agr. 10, No. 21,032 (1947).

Kilby, W.W.

TUNG FERTILIZATION.

Miss. Agr. Expt. Sta. Inform Sheet 379, 1 pp. (1946)*; Bibliog. of Agr. 10, No. 31,771 (1947).

Kilby, W.W.

CULTIVATION OF TUNG ORCHARDS.

Miss. Farm Research 10 (6), 1, 8 (June, 1947)*; Bibliog. of Agr. 11, No. 13,825 (1947).

Kilby, W.W.

HARVESTING, STORING AND MARKETING TUNG.

Miss. Farm Research 10 (11), 2 (Nov., 1947)*; Bibliog. of Agr. 12, No. 20,878 (1948).

Kilby, W.W.

HARVESTING, STORING AND MARKETING TUNG.

Miss. Agr. Expt. Sta. Inform. Sheet 401, 22 pp. (1947)*; Bibliog. of Agr. 12, No. 54,218 (1948).

Kilby, W.W.

USE OF COVER CROPS IN THE TUNG ORCHARD.

Tung World 2 (4), 22-3, 25 (1947)

"---It is highly recommended that the young trees be hand hoed three or four times per season, beginning the latter part of April and continuing at two or three week intervals." From the article,

Kilby, W.W.

NEW VARIETIES OF TUNG ANNOUNCED.

Miss. Farm Research 11 (4), 1,8 (Apr., 1948)*; Bibliog. of Agr. 12, No. 50,665 (1948).

Kilby, W.W.

VARIETIES OF TUNG.

Miss. Agr. Expt. Sta. Inform. Sheet 407, 2 pp. (Apr., 1948)*;
Bibliog. of Agr. 12, No. 71,302 (1948).

Kilby, W.W., and Groer, S.R.

RATES OF FERTILIZER ON TUNG TREES.

Mississippi Agr. Exp. Sta. Circ. 150, 8 pp. (Dec., 1949)
Miss. Farm Research 12 (12), 7-8 (Dec., 1949); American Tung
News 1 (5), 5-8 (Mar. 1950)

Liberal applications of fertilizer increase yields of fruit,
the oil content of the fruit and profits to the grower.

Kilby, W.W.

CULTIVATION OF YOUNG TREES.

American Tung News 1 (5), 3-8 (Mar., 1950)

Frequent, shallow cultivation of tung trees is recommended.

Kilby, W.W.

NOMENCLATURE OF TUNG.

Am. Tung News 1(6), 6-10 (April, 1950)

The terms fruit, segment, nut, hull, shell, kernel, wet
foots and filter cake are explained. Analyses are reported for
filter cake. (N,3.5-4.0%; P_2O_5 , 1.1%; and K_2O , 1.2%) and for
hulls (N,0.81%; P_2O_5 , 0.28%; and K_2O , 2.5-3.0%).

Kimbrough, W.D.

FERTILIZING STUDIES WITH TUNG TREES.

Proc. Am. Tung Oil Assoc. 1940, 8-11

The tung trees showed a marked response to fertilizer.
The latter caused increased tree growth and better filling of
the nuts of bearing trees.

Kitt, Moritz

ELAEOMARGARIC ACID.

Chem. Rev. Fett.-u. Harz-Ind. 11, 190-1 (Sept., 1904)*; Chem.
Zentr. 1904, II, 949-50

A discussion of the oxidation of eleostearic acid.

Kitt, Moritz

CHINESE WOOD OIL (ELAEOCOCCA OIL).

Chem. Rev. Fett.-u. Harz-Ind. 12, 241-4 (1905)*; Chem. Zentr.
1905, II, 1469.

A review of the production, chemical reaction and uses of
the oil.

Knight, H.G.

PROCESSING TUNG OIL.

Proc. Am. Tung Oil Assoc. 1940, 3-7

Following a general review of the tung industry, K. outlines
the agronomic and chemical research program of the U.S. De-
partment of Agriculture as it pertains to the culture of the

tung tree and the production of tung oil.

König, W.

EXPANSION OF PAINT FILMS DURING SWELLING.

Korrosion u. Metallschutz 18, 190-5 (1942)*; C.A. 37, 6909 (1943)

Methods are described for the testing of paint films.

"The linear expansion due to swelling was small with nitro-cellulose lacquers and with wood oil lacquers on an alkyl-phenol resin basis." From C.A. (abridged)

Kozlin, A.E., and Klimenko, K.T.

FIRST RESULTS OF INTERSPECIFIC CROSSING OF TUNG AT THE BATUMI BOTANICAL STATION.

Doklady Vsesoyuz. Akad. Sel'sko-Khoz. Nauk. V.I. Lenina (Proc. Lenin Acad. Agr. Sci. U.S.S.R.) 11-12, 21-4 (1946)*; Plant Breeding Abstracts 18 (3), 558 (1948)*; Oléagineux 4 (7), 464 (1949)

"The hybridization of A. fordii x A. cordata, begun in 1934, gave the following results: F₁ analog of the mother, flowering the third year; pollen half sterile. The flowers have the structure of A. cordata, the shape of A. fordii. The fruits are intermediate." Translated from Oléagineux.

Kozhin, A.E.

ON INCREASING THE PRODUCTIVITY OF TUNG TREE PLANTATIONS. Selekt. i Semen. 16 (7), 71-3 (July, 1949)(in Russian)*

Kreikenbaum, A.

CONSTANTS OF CHINESE WOOD OIL.

J. Ind. Eng. Chem. 2, 205.-8 (1910); C.A. 4, 2049 (1910)

"From an investigation of the literature but not from personal knowledge the author believes that Chinese and Japanese wood oils are different oils, which accounts for wide apparent variations in tables of constants. From over 2000 bbls. of Chinese oil, comprising 10 shipments in 3 yrs., samples from each bbl. give fairly uniform results. $d_{4}^{25} = 0.941$; free acid 1.7--7.1 average 4.4 mg. KOH; sapon. no. 189.8--191.8 av. 190.9; Hubl I no. av. 170.4, less than 4 hrs. absorption is insufficient, and Hanus method inapplicable, though correct for linseed oil. Westphal balance gives 1-2 points in third decimal too low, with this or linseed oil." From C.A.

Kronstein, Max

THE GEL STATE IN THE FORMATION OF ORGANIC COATINGS.

N.Y. Univ. Coll. Eng. 2nd Symposium on Varnish and Paint Chem. 1949, 17-47*; C.A. 45, 366 (1951)

"The oil gel is described as an intermediate nondispersable but swelling and increasingly coherent state between the sol, oil and the noncoherent solid oil. Infrared, ultraviolet, and x-ray spectra give evidence of mol. rearrangement and reduction in unsatn. This is true even in the case of nondrying oils which are capable of solidification. For study by electron microscopy, a sample of China wood oil was gelled so as to obtain the coherent gel at the top and to drive the process at the bottom further to the beginning of a noncoherent solid formation. Both were swollen in benzene, films formed, and a very thin deposit of Cr was deposited upon them in a vacuum. The solids version showed little of the characteristics of thick wood oil films which were quite evident in the gel portion. When the gel portion was more completely removed, little cohesive property remained. By contact with suitable materials (metal soaps) the gelled oils can be liquefied and are called liquefied, pregelled oils. They can be thinned and compounded with other oils, resins, etc. They can then be applied by the usual methods in forming varnish films. Spectra of the dried films indicate that while the pregelled oil serves as a seeding medium for growth, there is no evidence of cryst. structure. Charts, electron micrographs, and pictures are supplied to illustrate the evidence cited." From C.A.

Krug, C.A.

THE CULTURE OF TUNG IN THE UNITED STATES,
São Paulo (State) Sec. da Agr., Indus e Com. Dir. de Publicidade
Agr. Notas Agr. 6, 309-15 (1943)*: Bibliog. of Agr. 4, No.
23,460 (1944).

Kuentz, L.

CHINA WOOD OIL.
Rev. botan. appl. at agr. trop. 12 (127), 259 (1932).

Kuhrke, R.

THE DRYING OILS FROM VARIETIES OF IMPATIENS.
Seifen-Öle-Fette-Wachse 75, 239-41 (1949); Z. angew. Chem.
Jan. 1950 (abstract), C.A. 44, 1265 (1950).
"The seeds of Impatiens glanduligera contain about 50%
drying oil, 2-22% protein, and 6.5% H₂O. The oil has an f. p.
of approx. 4°, I no. (Kaufmann) 188, acid no. 1.82, sapon. no.
198.2, and contains 0.6% unsaponifiable." From C.A.
Eleostearic acid has been identified in the oil.

Lagasse, F.S., and Fisher, E.G.

CORRELATION OF FRUIT CHARACTERISTICS TO TOTAL YIELD OF OIL OF
INDIVIDUAL TUNG TREES.
Proc. Am. Tung Oil Assoc. 1940, 21-23

A statistical study of correlations among the following:
degree of filling, oil in kernel (%), oil in whole fruit (%),
and weight of oil per tree.

Lagasse, F.S.

THE RATE OF GROWTH AND INCREASE IN THE OIL CONTENT OF TUNG KERNELS.

Proc. Am. Tung Oil Assoc. 1941, 8-10

"It was found that in 1940 the dry weight of tung kernels increased most rapidly during the period July 25 to October 4."

"Results also indicate that the oil began to form quite early in the season as it was present in the fruit at the first sampling on June 28. It increased rather rapidly during the period July 12 to September 6, the kernels containing 68 per cent on a dry weight basis on the latter date."

"It was found that the actual amount of oil by weight in the kernels increased very rapidly during the period Aug. 9 to September 20—". Excerpts from the Summary of the article.

Lagasse, F.S.

U.S. FIELD LABORATORY FOR TUNG INVESTIGATIONS.

Florida Agr. Exp. Sta. Ann. Rept. 1944-1945. (57), 84-8*;

Soils and Fertilizers 10 (2), 209-10 (1947)(abstract)*; Oléagineux 3 (2), 114 (1948)

"Influence of different fertilizers on tung. Ammonium nitrate does not affect flowering. Sodium nitrate increases the cross section of the trunk as does K₂O while the effect of superphosphate is negligible. Trees deficient in Cu and Mg give seeds of weak germinating ability. Symptoms of Cu deficiency are aggravated by applications of N to soils already deficient in Cu. The author considers the importance of optimum rates of Mg/K and the influence of type of soil on the use of fertilizers." Translated from Oléagineux.

Lagasse, F.S.

RELATIVE RESISTANCE OF TUNG TREES TO WIND.

Am. Tung News 1(4), 8-9 (Feb., 1950)

Similar to "Hurricane Damage Surveyed by U.S.D.A." by F.S. Lagasse (Tung World 4 (11), 10-2 (Mar., 1950).

Lagasse, F.S.

HURRICANE DAMAGE SURVEYED BY U.S.D.A.

Tung World 4 (11), 10-2 (Mar., 1950)

Vase-shaped and "cartwheel" tung trees were more susceptible to wind damage than natural-head trees. Seedlings of LaCrosse trained to a single-trunk, natural-headed type of tree were less subject to wind damage than similarly trained average seedling trees.

Laguerre, J.

ABRASIN OIL AND ITS OUTLETS IN THE UNITED STATES.

Revue intern. produits coloniaux, 3 (26), 72-5 (1928).

LaPine, E.

ALEURITES FORDII AND ALEURITES MONTANA. THEIR CULTURE AND THEIR OIL.

L'Agronomie Coloniale, 22 (182), 67-8 (1933).

Large, J.R.

SEPTOBASIDIUM OBSERVED ON TUNG IN LOUISIANA.

Plant Disease Repr. 31 (8), 317 (1947); Biol. Abstracts 22, 1225, abs. No. 12,482 (1948)

"Septobasidium sp. probably S. Pseudopedicellatum, was observed on tung trees in Louisiana, 1st report on this host." From Biol. Abstracts.

Large, J.R.

CANKER OF TUNG TREES CAUSED BY PHYSAIOSPORA RHODINA.

Phytopathology 38, 359-63 (1948)*; Bibliog. of Agr. 12, No. 49,324 (1948); Biol. Abstracts 22, 2570, Abs. No. 25,433 (1948)

Large, J.R.

DISEASES OF TUNG ENCOUNTERED IN THE UNITED STATES.

Plant Disease Repr. 33 (1), 22-30 (1949)*; Olearia 3 (11), 857-8 (1949)*;

Descriptions of some important diseases of tung in the southern United States. Means of control.

Large, J.R., Painter, J.H., and Lewis, W.A.

THREAD BLIGHT. (CORTICIUM STEVENSII) IN TUNG ORCHARDS AND ITS CONTROL.

Phytopathology 40, 453-9 (May, 1950)*

Larroque, P.

SELECTION OF ABRASINS, I. RESULTS OBTAINED BY THE APPLICATION OF THE METHOD OF SELECTION, BASED ON CONSIDERATION OF COMPLEXES. Oleagineux 4 (3), 160-4 (article); (3), 465 (1949)(abstract)

Method based on successive improvements by increases in each generation of the percentage of individuals showing the selected complex. Botanical characteristics of Aleurites montana. The author defines 14 principle complexes and establishes 4 varieties of which 2 are interesting for culture." Translated from Oleagineux.

Larroque, P.

SELECTION OF ABRASINS, II.

Oleagineux 4 (4), 221-6 (article); (8/9), 562 (1949)(abstract)

"Study of the transmission of complexes characterized by productivity. The variable characters can be divided into qualitative and quantitative complexes capable of entering into the investigation of the complex of productivity. For good yields of abrasin, the soil should be fertile, and neither wet nor compact. After a single generation of selections the average yield has been tripled." Translated from Oleagineux.

Lauro, M.F. et al.

REPORT OF OIL CHARACTERISTICS COMMITTEE.

Oil & Soap 17, 151 (1940); C.A. 34, 6112 (1940).

"The following standards were adopted:

	Tung Oil	Perilla	Soybean	Linseed
d25	0.931-0.937	0.923-0.930	0.917-0.921	0.924-0.931
I no	160-175	193-208	127-141	170-204
Sapon. no.	189-195	188-197	189-195	188-196
Unsaponifiable	Max. 1.0%	Max. 1.5%	Max. 1.5%	Max. 1.7%
n _D ²⁵	1.516-1.520	1.479-1.482	1.470-1.476	1.477-1.482."

From C.A.

Leal, A. dos S.

ALEURITES MONTANA (LOUR.) E.H. WILSON, "ABRASIN".
Sao Paulo Sec. da Agr., Indus. e Com. Bull. de Agr. (44).
1943, 367-72 (1945).

Legros, J.

CULTIVATION OF ALEURITES, WOOD-OIL TREES.
Intern. Rev. Agr. 26, 129T-170T, 183T-197T, 247T-251T (1935)*;
Bull. Imp. Inst. 33, 257, 398 (1935).
"Contains a general account of the various species of
Aleurites and of the work being carried out in various countries."
From Bull. Imp. Inst.

Legros, J.

THE PROBLEM OF FERTILIZING ALEURITES PLANTATIONS.
Intern. Rev. Agr. 28, 197T-205T (1937).

Legros, J.

PRESENT STATE OF THE ALEURITES CULTIVATION IN THE BRITISH POS-
SESSIONS (COLONIES, PROTECTORATES, MANDATED TERRITORIES.
Bull. mens. de Renseignements Techniques. Institut Intern.
d'Agriculture, Rome, 1937*.

Leont'evskii, K.E.

A RATIONAL SYSTEM OF PROCESSING TUNG NUTS.
Pishchevîa Promysh. USSR. Sborn. 1, 49-54 (1945)*; Bibliog.
of Agr. 2, No. 10, 950 (1945).

LeRoux, J.C.

TUNG OIL PRODUCTION.
Farming in So. Africa 20, 555-6 (Sept., 1945)*; Bibliog. of
Agr. 10, No. 11, 638 (1947)

LeRoux, J.C.

THE ECONOMIC SIDE OF TUNG OIL PRODUCTION. HEAVIER YIELDS FROM
BUDDED TREES THAN FROM SEEDLINGS.
Farmers Weekly (Bloemfontein) 69, 415 (May 9, 1945)*; Bibliog.
of Agr. 7, No. 19, 044 (1945).

LeRoux, J.C.

TUNG TREE CULTIVATION.

Farmer [Pietermaritzburg] 34 (20), 10 (May 18, 1945); (21), 6 (May 25, 1945)*; Bibliog. of Agr. 7, 6711 (1945).

Levy, Pierre

THE HALOGEN INDICES OF ALEURITES OIL (CHINA WOOD OILS)

Compt. rend. 196, 549-52 (1933)*; C.A. 27, 2589 (1933)

"The Aleurites oils from, Aleurites fordii and Aleurites montana, form one constituent in rapid-drying oil varnish. The oil contains 80-95% of the triglyceride of eleostearic acid; the acid has the formula $\text{CH}_3(\text{CH}_2)_3\text{CH}:\text{CHCH}:\text{CHCH}:\text{CH}(\text{CH}_2)_7\text{COOH}$. By heating a thin film of oil in the presence of Br, the 3 ethylene bonds are satd: the Br no. obtained is reported in terms of the 1 no. For oil boiled at 295° the Br indices are 165 and 173, indicating the disappearance of 1 ethylene bond in the eleostearic group." From C.A.

Levy, Pierre.

CHINA WOOD OIL

Off. Natl. Richerches Sci., Bellevue, France, 34 pp., 1934*;

Bull. Imp. Inst. 31, 446(1933).

"Deals with the properties and uses of tung oil." From Bull. Imp. Inst.

Li, C.L.

TUNG OIL TRADE OF CHINA.

Commercial Press, Shanghai, China, 212 pp. 1934 (in Chinese)*

Li, Lae-Yung

A NOTE ON BUDDING TUNG TREES.

Lignan Sci. J. 22 (1/4), 142-6 (1948)*; Biol. Abstracts 23, 213, Abs. No. 1841 (1949); Bibliog. of Agr. 12, No. 38,126 (1948)

"Methods of budding are descr." From Biol. Abstracts

Li-Lae-Yung

THE INFLUENCE OF STRATIFICATION OF TUNG SEEDS UPON EMERGENCE AND ESTABLISHMENT OF SEEDLINGS IN THE NURSERY.

New Zealand J. Sci. Technol. A. 25, 43-8 (June, 1943)*;

Bibliog. of Agr. 4, 17,830 (1944)

Li, S.F.

TUNG OIL AND TUNG OIL INDUSTRY OF HUNAN.

Hunan Econ. Bureau, China, 112 pp., (1935)(in Chinese)*

Li, S.Y.

TUNG OIL INDUSTRY OF SZECHUAN PROVINCE.

International Trade Bull. 7 (9), 49-68 (1935)*

Li, Ying-Chen

TUNG TREES YIELD BEST AT 12-16 YRS.

Tung World 1 (10), 13 (Feb. 1947)

Conclusion of article by same author entitled "China Now has 1,720,000 Acres Planted in Tung Trees, Study Shows".

"There is no doubt that there are many varieties of tung oil trees besides Aleurites fordii. Local classifications of the different varieties are more or less liberal in meaning and not scientific. Based on non-scientific taxonomy some twenty varieties are easily classified. Other students of tung have a tendency to cut the number much smaller. The author has re-grouped the varieties into these classifications, namely: (1) Aleurites fordii, the so-called Large-Rice tung, (2) Small-Rice tung, (3) Deep-color-flower tung, (4) Light-color-flower tung, (5) Persimmon-cake tung, and (6) Peach tung or Fire-wood tung." From the article.

Liang, L., and Chang, T.P.

OIL CONTENTS OF SEVERAL KINDS OF TUNG SEEDS.

Nanking Natl. Central Univ. Collected Agr. Papers 1935, 140-9.*

Liao, C.Y.

THE SO-CALLED RIVALS OF TUNG OIL.

Chemistry (China) 3, 899-910 (1936)(in Chinese)*

Lighthelm, S.P., Rudloff, E. von, and Sutton, D.A.

PREPARATION OF UNSATURATED LONG-CHAIN ALCOHOLS BY MEANS OF LITHIUM ALUMINUM HYDRIDE. SOME TYPICAL MEMBERS OF THE SERIES. J. Chem. Soc. 1950, 3187-90

Several acids and esters of known constitution have been subjected to reduction with lithium aluminum hydride and the yields and purities of the products assessed.

" α -Elaeostearic acid (13.9 g., 0.05 mol.) and lithium aluminum hydride (2.36 g., 0.63 mol.; i.e. 70% excess) were used. The product, in ethereal solution, was washed with aqueous sodium carbonate solution and worked up in the usual way, yielding a slightly yellow oil (10.88 g., 82.5%) which solidified below 25°; the somewhat low yield was attributed to the formation of stable emulsions during the alkaline washing. The oil, α -elaestearyl alcohol, gave on ultra-violet examination, $E_{1\text{ cm}}^{1\%}$, 1310, 1730, 1334 at λ_{max} 261, 270.5, and 281 m μ ., respectively; (in ethyl alcohol); on distillation (b.p. 150°-154°/0.2 mm.) a solid β -elaestearyl alcohol was obtained, having m.p. 58.5°-59.5° after recrystallization from isooheptane; this gave, on ultra-violet examination $E_{1\text{ cm}}^{1\%}$, 1493, 1996, 1529 at λ_{max} 258, 268.5, and 279 m μ ., respectively (in ethyl alcohol) (Found: C, 81.1; H, 12.8%. $\text{C}_{18}\text{H}_{32}\text{O}$ requires C, 81.75; H, 12.2%). The positions and intensities of the ultraviolet absorption bands of the oil (before distillation) and the solid of m.p. 58.5-59.5° correspond very closely to those for α - and β -elaestearic acids respectively (O'Connor and Heinzelman, J. Amer. Oil Chem. Soc. 1947, 24, No.6,

212, record that the central bands of the α - and β -elaeostearic acids have $E_{1\text{cm}}^{1\%}$ 1686 at λ_{max} 270 mu and $E_{1\text{cm}}^{1\%}$ 2161 at λ_{max} 268 mu, respectively (in ethyl alcohol solution)." From the article.

Oxidation of either α - or β -elaeostearyl alcohols gave both azelaic and n-valeric acids., Hydrogenation of β -elaeostearyl alcohol in ethyl alcohol in the presence of Adams catalyst gave octadecan-1-ol, m. 57.5-58.5°. β -elaeostearyl alcohol, m. 58.5-59.5°, was also obtained by reduction of β -elaeostearic acid with lithium aluminum hydride.

Lin, D.Y.

CHINESE WOOD OIL

Bureau of Public Information, Shanghai Comm. Bull. No. 1, (1919)(in Chinese)*

Lin, K.

MORPHOLOGY AND EXPERIMENTAL PROPAGATION OF ALFURITES MONTANA.

Nung Pao 2, 366-9 (1944)*; Olegineux 3, 652 (1948)(abstract).

Description of the structure of the flower and of the fruit and of the growing behavior of *A. montana* in Kwangsi Province.

Ling, S.A.

TUNG OIL.

Gov. Testing Bur. Hankow, China, 68 pp., 1933 (in Chinese)*

Ling, T.G.

DEVELOPMENT OF TUNG OIL INDUSTRY IN THE U.S. AND THE BRITISH EMPIRE.

Gov. Testing Bur. of Hankow, 18 pp. 1930.*

Ling, T.G.

ON TESTING OF TUNG OIL.

Govt. Testing Bur. Hankow, 57 pp., 1931.

Lippert, Walther

BODIED LINS EED OIL AND OIL PAINTS.

Z. angew. Chem. 10, 779-82 (1897)

Drying tests are briefly reported for 2 tung oil paints.

Liu, F.C., and Huang, P.Y.

METHOD OF CULTIVATION OF TUNG OIL TREE.

Reconstruction Bur. Chungking, Szechuan, China, 20 pp., 1931.*

Liu, H.

A NEW INDUSTRY OF THE NEW WORLD. A REPORT ABOUT THE TUNG OIL PRODUCTION IN THE U.S.A.

Submitted to the Chinese Educational Mission, 1933(in Chinese)*

Liu, P.W.

CHEMICAL STUDY OF THE FRUIT OF ALEURITES FORDII.
J. Agr. Chem. Soc. Japan 10, 25-30 (1934)

Liu, S.

OIL AND PAINT.

Chinese Inst. Engrs. Special Szechuan Investigation Rept., 27
pp., 1935 (in Chinese)*

Reported to contain information about tung oil.

Liu, S.Y.

VARNISH FROM TUNG OIL AND RESIN.

Chem. Ind. (China) 4 (1), 108-114 (July, 1929)*

Lo, Chen-Chuan, and Kao, Ping-Shu

TUNG OIL AND INTERNATIONAL MARKET.

Orientalia, Inc., New York, N.Y., 63 pp. 1948.

Sino-International Economic Publication No. 6. A general review of the economic aspects of the tung industry consisting of the following chapters: I. Tung oil production in China, II. Tung oil export trade of China, III. Tung oil industry development in the United States, IV. Tung oil production in other countries, and V. Future prospect of tung oil in international market.

Long, A.

CULTURE OF ALEURITES FORDII IN THE SOUTHERN SHAN STATES, BURMA.
Revue botan. appl. et agr. trop. 14 (156/157), 827 (1934).

Long, J.S.

FILM FORMATION, FILM PROPERTIES, FILM DETERIORATION.

J. Oil & Colour Chemists' Assoc. 22, 377-445 (1949); C.A. 44, 3721 (1950)

Films formed as a result of oxidative changes of unsaturated esters are reviewed.

One phase of the work includes a study of pure esters of oleic, linoleic, linolenic and eleostearic acids. Derivatives of the last include: glycerol ester of eleostearic acid, pentaerythritol ester of eleostearic acid, eleostearic-glycerol alkyd (1 mol. phthalic, 1 mol. eleostearic acid per 1 mol. glycerol), eleostearic pentaerythritol alkyd (1 mol. phthalic, 2 mols. eleostearic acid per 1 mol. pentaerythritol), and eleostearic short oil glyceride (7 mols. phthalic, 4 mols. eleostearic acid per 6 mols. glycerol).

Loustalot, A.J., Gilbert, S.G., and Drosdoff, M.

THE EFFECT OF NITROGEN AND POTASSIUM LEVELS IN TUNG SEEDLINGS ON GROWTH, APPARENT PHOTOSYNTHESIS, AND CARBOHYDRATE COMPOSITION.
Plant Physiol. 25, 394-412 (July, 1950)*; Biolog. of Agr. 14, No. 65, 871 (1950).

Loustalot, A.J., and Lagasse, F.S.

COMPARISON OF WINTER AND EARLY SPRING APPLICATIONS OF NITROGEN TO TUNG TREES.

Proc. Am. Soc. Hort. Sci. 48, 51-8 (1946); C.A. 41, 7614 (1947)

"Winter fertilization of tung orchards with NH_4NO_3 seems more practical than spring fertilization, since the trees readily absorbed the N and translocated it to the growing points, where it was available when spring growth started. There was no evidence that early fertilization caused the trees to bloom earlier." From C.A.

Lundberg, W.O.

THE ROLE AND MECHANISM OF OXIDATION IN THE FILM FORMATION OF DRYING OILS.

Official Digest Federation Paint & Varnish Production Clubs No. 302, 199-211 (1950)*; C.A. 44, 4692 (1950)

Trilinolenin, trilinolein, trieleostearin, linseed oil, castor oil and pentaerythritol oleate were oxidized in a flat-bottomed Warburg apparatus and peroxide values determined. The latter were lower than predicted.

Maas, J.A.

CULTURE OF ALEURITES.

Landbouwk. Tijdschr. (Wageningen) 60, 195-203 (May, 1948) (in Dutch)*; Bibliog. of Agr. 12, No. 57,162 (1948).

McCullough, W.G.

ARGENTINA COMPETES WITH CHINA AS SOURCE OF SUPPLY FOR TUNG OIL. Foreign Trade 6, 856-7 (Nov. 5, 1949).*

McCullough, W.G.

ARGENTINA - SOURCE OF SUPPLY FOR TUNG OIL.

Can. Chem. Process Inds. 33, 1073 (1949)

McGregor, C.J.

NOTES ON THE TUNG OIL TREE.

E. African Agr. J. 1 (2), 127-30 (Sept., 1935)

Growth habits of the tung tree, agronomic practices in the U.S. and tung oil yields are reviewed following a visit by the author to Florida and Georgia, U.S.A. in 1934. Tung oil trees, handled as forest trees in the Southern Highlands, were unsuccessful. To thrive in Tanganyika tung trees must be treated as delicate, heavy yielding fruit trees.

McKinney, R.S.

STUDIES IMPROVING TUNG OIL.

Fla. Grower 56 (4), 18, 21 (Apr., 1947)*; Bibliog. of Agr. 11, No. 5707 (1947).

McKinney, R.S.

COLLABORATIVE ANALYSIS OF TUNG FRUIT BY THE WHOLE FRUIT AND COMPONENT PROCEDURES.

Proc. Am. Tung Oil Assoc. 1949, 25-30

"Collaborative studies on six lots of tung fruit varying widely in content of moisture, hull, and oil have shown good agreement for the oil content when analyzed by either the whole fruit procedure or by the component procedure adopted as a tentative method for the analysis of tung fruit by the American Oil Chemists' Society. These collaborative analyses have shown that it is unnecessary to make any correction in the oil content of tung fruit analyzed by the whole fruit procedure as no significant difference has been found between the results obtained by this procedure and those obtained by the component procedure. The highly significant differences observed in the results reported for the moisture content have indicated that serious errors may be encountered by calculating the oil content of tung fruit to a moisture-free basis." Summary of the article.

McKinney, R.S.

SOUTHERN TUNG TREES PROVIDE A NEW OIL INDUSTRY.

Southern Chemist 10 (3), 95-100 (Nov., 1950)

A general review of the historical, economic, and technological aspects of the tung industry in the U.S.

McKinney, R.S.

ELFESTEARIC ACID, $C_{18}H_{34}O_2$.

In Kirk, R.E., and Othmer, D.F. (Eds.) Encyclopedia of Chemical Technology 6, 279-81 (1951).

A review of the chemistry of eleostearic acid.

McKinney, R.S., Halbrook, N.J. and Agee, C.W.

A NEW PROCEDURE FOR THE ANALYSIS OF TUNG FRUIT.

J. Am. Oil Chemists' Soc. 25, 265-7 (1948); C.A. 42, 7994 (1948).

See "A progress Report on the Sampling and Analysis of Tung Fruit" by the same authors (Proc. Am. Tung Oil Assoc. 1948, 66-71; C.A. 42, 7065 (1948)

McKinney, R.S., and Morris, N.J.

PREPARATION OF TUNG OIL-PHENOLIC RESIN VARNISHES

Proc. Am. Tung Oil Assoc. 1947, 18-20

"Studies were made of methods for preparing short-, medium-, and long-oil varnishes from phenolic resin and straight tung oil and from phenolic resin and mixtures of tung oil and linseed oil. These studies have indicated that, because of the reactivity of American tung oil, special care must be employed in using it in the preparation of straight phenolic resin varnishes. The results of tests on these varnishes indicate that long-, medium-, and short-oil varnishes prepared from phenolic resin and tung oil gave films that were much more resistant to the passage of water than did varnishes of equivalent

oil length made with both tung oil and linseed oil, that the use of linseed oil in combination with tung oil reduced the alkali resistance of the films, and that short-oil varnishes prepared from phenolic resin and straight tung oil or a 50:50 mixture of tung oil and linseed oil yielded films that were brittle and lacking in elasticity." From the Summary of the article.

McKinney, R.S., and Oglesbee, R.E.

METHODS OF ANALYSIS USEFUL IN EVALUATING TUNG FRUIT.

Proc. Am. Tung Oil Assoc. 1946, (I), 1-5; Tung World 1, 14-15 (July 1946)*; C.A. 40, 5577 (1946)

"The evaluation of tung fruit arriving at the mill depends upon three factors, namely, the amount of foreign matter present, the percentage of moisture, and the percentage of oil in the tung fruit. Foreign matter should be removed from the tung fruit when it arrives at the mill and its weight added to the tare. Then every effort should be made to secure as representative a sample as possible of the lot of clean tung fruit."

"For the determination of the oil and moisture content of tung fruit, it is believed that the procedures being developed by the Subcommittee on Tung Fruit of the American Oil Chemists' Society will yield the most reliable and accurate results."

From the paper.

Analytical results obtained independently by seven collaborators on two different samples of tung fruit are tabulated and examined statistically.

McMulty, J.H. et al.

AMERICAN TUNG OIL INDUSTRY PROSPERING.

Paint, Oil Chem. Rev. 82 (16), 16-16A (Oct. 14, 1926)

A report of the Tung Oil Comm. of the Educational Bur. of the Natl. Assoc. of Paint, Varnish Mfrs.

The civil war in China is interfering with tung oil trade. Exports of the oil to the U.S. is estimated at only 30,000 tons for 1926 in comparison with 42,000 tons in 1925. Satisfactory progress has been made by the 2 tung groves established in Florida by the American Tung Oil Corp.

Majima, Riko, and Okada, Teppei

CATALYTIC REDUCTION OF ELEOSTEARIC ACID.

Sci. Repts. Tohoku Imp. Univ., Sendai, Japan. 1, 169-70 (1912)*; Chem. Zentr. 1912, II, 1780 (no abstract)

Maquenne, M. L.

THE SOLID ACID FROM THE OIL OF ELAEOCOCCA VERNICIA.

Compt. rend. 135, 696-698 (1902)*; J. Chem. Soc. 84, 1, 62 (1903).

"Cloeze (Compt. rend., 81, 469, 1875; 82, 501 and 83, 943, 1876) isolated from the oil of Elaeococca vernicia an acid (m. p. 48°) to which he gave the name elaeomargaric acid, $C_{16}H_{29}.CO_2H$; it was very readily converted, by dissolving in carbon disulphide, into an acid (m. p. 71°) of the same composition which he took to be a polymeride, and called elaeostearic acid. On reinvestigation, it was found that the two acids had the same mol. weight, and further that the acid melting at 48° was converted into the acid melting at 71° by the action of traces of sulphur or iodine. The two acids are therefore probably stereoisomeric, and it is suggested that they should be called alpha- and beta- elaeostearic acid respectively. Owing to the great rapidity with which the acids absorb oxygen, it was extremely difficult to get trustworthy analyses. The numbers given by the purest material point to the formula $C_{17}H_{29}.CO_2H$, the acids being therefore isomeric with linolenic acid. Oxidation of both acids with permanganate produced azelaic acid (m. p. $105-106^{\circ}$) and valeric acid." From J. Chem. Soc.

Marcusson, J.

THE POLYMERIZATION OF FATTY OILS.

Z. angew. Chem. 33, I, 231-2, 234-5 (1920); C.A. 15, 318 (1921).

"Blowing fatty oils causes a decrease in I no. and an increase in sp. gr. due to polymerization and oxidation. The detn. of the mol. wt. tends to disprove this idea, for the mol. wts. detd. were as high as those of the original oils in some cases and lower in other cases; this latter is explained by the decompn. of high molecular fatty acids by O. Blown oils contain water-sol. and volatile fatty acids. A blown rape oil gave a mol. wt. of 360 and contained 14% of dark hydroxy acids sepd. by petroleum ether. When the volatile acids were distd. from the petroleum ether-sol. acids the mol. wt. rose to 412. As the mol. wt. of the fatty acids containing the most C is 338 it is evident that polymerization has taken place. To det. whether chemicals produce polymerization 10 g. of linseed oil were dissolved in 40 cc. benzene and 3 g. $AlCl_3$ added and the soln. was heated, treated with HCl and shaken out with ether. A viscous oil of I no. 120, sapon. no. 185 and acid no. 15.6 resulted. The fatty acids had a mol. wt. of 360. Other oils were treated in a similar manner and in each case the I no. fell but not to such an extent as to indicate pronounced polymerization. Chinese wood oil is readily acted upon by $AlCl_3$ and $FeCl_3$. The fat from the yeast Endomyces vernalis when the yeast has been dried with salt shows polymerization and likewise the sterol present." From C. A.

Markland, L. K.

TUNG TREES GROW IN LOUISIANA.

New Orleans Port Rec. 2 (12), 20-2 (Aug., 1944); 3, 15-8 (Sept., 1944)*; Bibliog. of Agr. 5 Nos. 16,675; 21,197 (1944).

Markley, K. S.

FATTY ACIDS. THEIR CHEMISTRY AND PHYSICAL PROPERTIES.

Interseience Pub. Inc., New York, 668 pp., 1947.

The physical and chemical properties and the chemical reactions of the eleostearic acids are critically reviewed in relation to those of other fatty acids.

Markley, K. S.

VEGETABLE OIL CROPS AS FOOD, FEED, AND INDUSTRIAL RAW MATERIALS.

Cotton Gin and Oil Mill Press 52 (11), 18-21, 47-53 (May 26, 1951).

The major vegetable oil crops of the world are reviewed with information on their production, on the extraction, properties and uses of the oils obtained from them, and on the value and uses of their byproducts. These include soybeans; cotton, peanut, corn, olives, coconut, oil palms, flax, tung, and castor seed. Tung oil, obtained from the fruit of Aleurites fordii and A. montana, has been produced in China since the 12th century. Plantings on a commercial scale, started in the United States about 1923, have increased producing about 11,000 tons of oil in 1949. Plantings in Argentina, Brazil and Paraguay have also been successful. By 1952, Argentina alone is expected to produce 30,000 tons of tung oil. The surplus from Latin America is finding a ready market in the United States where it is used in varnishes, electrical insulation, wallboard, caulking compounds, gaskets, and waterproofed fabrics.

Massey, G. F.

CATTLE AND TUNG.

Farm Impl. News 68 (17), 44-5, 80, 82, 84, 86, 88 (Aug. 15, 1947)*; Bibliog. of Agr. 11, No. 25,881 (1947).

Masy Yanes, F. de

TUNG OIL AND ANTI-CORROSIVE PAINTS.

Rev. Indus. y Fabril 4, 562-3 (1949); Bibliog. of Agr. 14, No. 40789 (1950).

Mayr, M.

PAINT AND VARNISH INDUSTRY, AT THE FIRST SOUTH-GERMAN DRUGGISTS EXHIBITION IN MUNICH.

Farben-Ztg. 18 (47), 2542-3 (1913).

The varnish works at Kreuznach was represented by a varnish "Chinoleum" which was made from China wood oil and was excellent in durability and elasticity and which can be walked on as early as 5 hrs. after application.

Mays, J. R., Jr.

HOW TUNG NUTS ARE ANALYZED IN A MODERN LABORATORY.

Tung World 3 (3), 9, 18-9 (1948).

A brief discussion of present methods of determining the oil content of tung fruit. The author prefers the whole fruit method.

Megerle, F.

THICKENING OF WOOD OIL VARNISHES.

Farben-Ztg. 18, II, 2230 (1913).

- Mello, A. T. de
OILSEED PLANTS AND ADVANTAGES OF THE CULTURE OF TUNG.
Campo (Rio de Janeiro) 16 (192), 63-7 (Dec., 1945)*; Bibliog. of
Agr. 8, No. 20,262 (1946).
- Mendes, P. T.
CULTURE OF TUNG IN THE REPUBLIC OF ARGENTINA
Rev. de Agr. (Piracicaba) 22, 181-8 (July/Aug., 1947)*; Bibliog.
of Agr. 12, No. 24,089 (1948).
- Meng, C. Y. W.
OUR SILK, TUNG OIL, AND TEA.
China Trade Monthly 1, 161-2, 201-3 (Mar., 1947)*; Bibliog. of
Agr. 11, No. 16,808 (1947).
- Merrill, Samuel, and Greer, S. R.
TUNG SEEDLINGS. RESULTS OF THREE YEARS' FERTILIZATION TESTS
DESCRIBED BY EXPERTS.
Tung World 1 (5), 18 (Sept., 1946).
See "Three Years' Results in Fertilization of Tung Seedlings
in the Nursery" by the same authors (Proc. Am. Soc. Hort. Sci.
47, 181-6 (1946)).
- Merrill, Samuel, Kilby, W. W., and Greer, S. R.
FERTILIZERS FOR THE TUNG NURSERY.
Proc. Am. Tung Oil Assoc. 1942, 15-16.
Similar to "Fertilization of Tung, Seedlings in the Nursery"
by the same authors (Proc. Am. Soc. Hort. Sci. 41, 167-70 (1942)).
- Merz, Otto
WOOD OIL, TUNG OIL, CHINA OIL, ETC.
Kunststoffe 15, 215-6 (1925); C. A. 21, 1716 (1927).
The so-called ice-flower formations caused by the drying of
China wood oil are due to the formation of wrinkles in the
drying oil film. The constants of Chinese and Japanese wood
oils are compared.
- Meyer, A. C.
CULTURE OF TUNG IN THE STATE OF SAO PAULO.
São Paulo Sec. da Agr. Indús. e Com. Bull. de Agr. (44) 1943,
362-5 (1945); Bibliog. of Agr. 8, No. 13, 676 (1946).
"Properties and uses of tung oil and cultivation of the plant."
From Bibliog. of Agr.
- Meyer, A. C.
CULTURE OF TUNG.
São Paulo (State) Sec. da Agr. Indús. e Com. Dir. de Publicidade
Agr. Notas Agr. 6, 305-8 (1943)*; Bibliog. of Agr. 4, No. 23,
463 (1944).
- Meyer, A. C.
TUNG, ETC.
Rev. Rural Bras. 23 (280), 34-5 (Dec., 1943)*; Bibliog. of Agr.
4, No. 18,118 (1944).

Meyer, A. C.

TUNG CULTURE.

Chacaras e Quintais 69, 731-2 (1944)*; Bibliog. of Agr. 5, No. 21, 198 (1944).

Mikusch, J. D. von

THE WOBURN METHOD FOR THE DETERMINATION OF THE TOTAL IODINE NUMBER, AND ITS APPLICATION TO THE DETERMINATION OF THE CONJUGATED, UNSATURATED PORTION.

Farbe u. Lack 56, 341-8, 387-93 (1950); C. A. 45, 881 (1951).

"The method (cf. v. M. and Frazier, C. A. 36, 288) and its applications are reviewed. 63 references." From C. A.

Miller, J. C., and Kimbrough, W. D.

CULTURE OF TUNG-OIL TREES IN LOUISIANA.

Louisiana Agr. Expt. Sta. Circ. 17, 4p. (1936)*; Expt. Sta. Rec. 76, 632 (1937).

"This contains general information on culture, propagation, harvesting, protection from pests, and utilization." From Expt. Sta. Rec.

Minatra, O.

THE TUNG TREE IS TEMPERMENTAL.

Prog. Farmer, Tex. Ed. 60 (10), 74 (Oct., 1945)*; Bibliog. of Agr. 7, No. 12, 665 (1945).

Moffitt, R. M.

HOW TO GET MOST FROM FERTILIZER.

Tung World 2 (12), 16, 25 (1948).

Fertilization of tung trees should be planned to furnish the amounts and kinds of minerals shown to be needed by leaf analyses.

Moffitt, R. M.

MANY PROBLEMS MARKETING TUNG.

Am. Tung News 1 (2), 6 (Sept., 1949).

Moore, Thomas

SPECTROSCOPIC CHANGES IN FAT ACIDS. I. CHANGES IN THE ABSORPTION SPECTRA OF VARIOUS FATS INDUCED BY TREATMENT WITH POTASSIUM HYDROXIDE.

Biochem. J. 31, 138-41 (1937); C. A. 31, 4517 (1937)..

"The fats were rapidly saponified with KOH. The fat acids were separated and then refluxed 24 hrs. with KOH. The absorption after such treatment increased with the degree of unsaturation of the acids. The absorption maxima were at about 230 m μ with vegetable and land mammal fats. The absorption of the latter was considerably, in some cases entirely, developed in the natural state. Marine oils developed absorption about 270 m μ , along with less intense absorption at 230 m μ . The acids responsible for the development of absorption appeared to be those that had 2 or more double bonds. Tung-oil acids showed intense absorption at 270 m μ even before saponification." From C. A.

Morrell, R. S.

STUDIES OF CHINESE WOOD OIL. BETA-ELEOSTEARIC ACID
Proc. Chem. Soc., 28, 235; J. Chem. Soc., 101, 2082-9 (1912);
C. A. 7, 967 (1912).

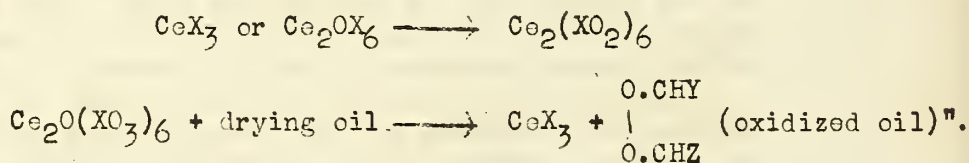
"When he exposed the oil to the light in tightly stoppered bottles, M. obtained a triglyceride, $(C_{18}H_{20}O_2)_3C_3H_5$ or $(C_{18}H_{31}O_2)_3C_3H_5$, rosettes from C_6H_6 and EtOH, m. $61-2^\circ$, which combines rapidly with O, liberating an aldehyde, and, when const. wt. is reached, approximates a compound, $(C_{18}H_{31}O_6)_3C_3H_5$, probably a peroxide. When dry O or N is passed over the triglyceride (m. $61-2^\circ$) at 100° , it loses 8% of its wt. to form a volatile compd., sol. in alk. and reducing Fehling soln.; on saponifying the glyceride with alc. KOH, it forms the potassium salt, rhombic plates, of Beta-eleostearic acid, $C_{18}H_{32}O_2$ or $C_{18}H_{30}O_2$, needles or laminae, m. 72° (cf. Maquenne, Compt. rend., 135, 696), readily forming the ammonium, silver, calcium, and barium salts and the ethyl ester, oil, b.p. 232° , which takes up about 2 ats. O. With 4 ats. Br in glacial AcOH at 0° , the acid forms a tetra-bromo acid, $C_{18}H_{32}O_2Br_4$. Oxidation of K Beta-eleostearate yields azelaic and n-valeric acids. The research has been followed in order to study the chem. changes occurring during the "drying" of the oil." From C. A.

Morrell, R. S.

STUDIES OF DRYING OILS. I. PROPERTIES OF SOME CERIUM SALTS OBTAINED FROM DRYING OILS.
J. Chem. Soc. 113, 111-24 (1918); J. Soc. Chem. Ind. 37, 130A (1918); Chem. Zentr. 1919, I, 514; C. A. 12, 868 (1918).

"Cerous salts of the principal fatty acids in drying oils and of abietic acid were prepared by the interaction of a solution of a cerous salt and of a solution of the potassium salt of the respective acids. All these salts are colourless and insoluble in water. Cerous stearate, elaidate, beta-elaeostearate, and palmitate are insoluble in ether, whilst cerous oleate, linolate, linolenate, alpha-elaeostearate, and abiotate are soluble in ether and oil of turpentine. In each case the salt is of the normal type, CeX_3 . Ethereal solutions of the cerous salts of unsaturated fatty acids darken on exposure to the air, and in the case of the linolenate yield buff-coloured precipitates giving a peroxide reaction and having a composition corresponding with the formula of a basic ceric oxylinolenate $CeO(XO_2)_2$. The brown ethereal solution appears to contain a mixture of the salts CeX_3 and CeX_4 , or a basic salt, $2CeO(XO_2)_2$, formed by the oxidation of CeX_3 . After longer exposure of the solution to the air an insoluble salt of the type $CeO(XO)_2$ is produced. An ethereal solution of cerous oleate only darkens slightly on exposure, and becomes slightly turbid. Olive oil forms cerous salts of the normal type, CeX_3 , soluble in ether, and changing but slowly into the insoluble type, but after being heated in the absence of air it yields not only the normal salt, but also a soluble salt of the CeX_4

type and an insoluble basic ceric salt CeOX_2 . Poppy-seed oil behaves in a similar way, whilst thickened linseed oil from which the polymerized compound has been extracted with acetone gives an increased yield (up to nearly 50%) of the basic ceric salt, CeOX_2 . Raw linseed oil yields the normal salt, CeX_3 , and about 12.4% of the basic ceric salt. These facts support the author's view (this J., 1915, 105) that there is a change in the intramolecular linkings prior to polymerization when drying oils are polymerized by heat. Cerous alpha-elaestearate from Chinese wood oil is readily soluble in ether, and yields an acid with the high m.pt. and high iodine value of alpha-elaestearic acid, but after some time the salt becomes insoluble in ether, and then yields a mixture of a crystalline acid (m.pt. 45° to 46° C.) with iodine value 177.8, and a syrupy acid with lower iodine value, which liberates iodine from potassium iodide. These results show that partial oxidation of the cerous salt readily takes place, although the ethereal solution yields no precipitate when subjected to the action of a current of air or oxygen. The presence of mixed unoxidized and oxidized acids in the insoluble salt may be attributed to the formation of an insoluble basic ceric salt of the type $\text{Ce}_2\text{X}_6\text{O}$, and subsequent partial oxidation of the acid. The absence of any appreciable amount of beta-elaestearic acid shows that stereoisomeric change does not take place. The oxygen absorption of cerous alpha-elaestearate, the initial stage of which takes more than 10 days, indicates that with the formation of a basic ceric alpha-elaestearate of the type $\text{Ce}_2\text{O}(\text{XO}_2)_6$ from CeX_3 or $\text{Ce}_2\text{X}_6\text{O}$, one mol. of oxygen per mol. of acid is absorbed, so that the iodine value and iodine-liberation value become approximately equal. It is only after exposure of a year to oxygen that the second double linking of elaestearic acid becomes peroxidized. The peroxidic acid shows gradual polymerization until the syrupy liquid has set to a varnish. It is unstable with alkalis, but stable with acid, and is not reduced by zinc dust and acetic acid. The general conclusion drawn from these results is that the function of cerium alpha-elaestearate as a drier may be represented by the following scheme:--



From J. Soc. Chem. Ind. (abridged).

Morrell, R. S.

THE YELLOWING OF DRYING OILS.

Oil & Fat Inds. 4, 265-6 (1927).

A brief discussion of the yellowing of white enamels in which the pigments and oils (including China wood oil) were varied.

Morrell, R. S., and Phillips, E. O.

THE OXIDATION OF DRYING OILS.

J. Oil & Colour Chemists' Assoc. 23, 103-21 (1940)*; C. A. 35, 333-4 (1941).

"**When β -eleostearin was heated to 230-240° in an inert atm. until nearly or actually gelled, it was so highly activated that on handling and examn., a state of complete oxidation was attained with formation of a monoperoxide "oxyn." Treatment with Me_2SO_4 at ordinary temps. accelerates the conversion of tung oil into a system which is extremely sensitive to oxidation to an "oxyn" gel and in this respect is more active than heat-treatment. Similar results were obtained by heating to 100° with Et_2SO_4 , which has a weaker activating action.**" From C. A.

Morrell, R. S., and Wornum, W. E.

THE PROGRESS OF THE PAINT AND VARNISH INDUSTRY DURING 1929.

Ind. Chemist 6, 26-8 (1930).

Reference is made to a summary of information on tung oil by Jordan (J. Oil & Colour Chem. Assoc. 12, 113 (1929), and investigation of the oxidation of beta-eleostearin by Morrell and Marks (J. Oil & Colour Chem. Assoc. 12, 183 (1929) and a paper by Kaufmann (Ber. 62, 392 (1929) dealing with partial halogenation of beta-eleostearin and China wood oil.

Mourá, V.

THE PROGRESS OF COOPERATIVES IN THE SOUTH. WHEAT, WOOD AND TUNG OIL.

Observador Econ. e Financ. 15 (170), 108-14 (Mar., 1950)*.

Mowry, H.

VARIATION IN THE TUNG-OIL TREE

Revue botan. appl. agr. trop. 14 (152), 308-309 (1934).

Munzert, H.

AN EXAMPLE OF COLLOIDAL CHANGE IN PAINTS.

Farben-Ztg. 34, 1667 (1929)*; Paint Varnish Production Mgr. 16 (June, 1929); Chem. Zentr. 1929, II, 219.

"An oil varnish, consisting of one part by weight of fused Congo copal, and two parts by weight of a mixture of bodied linseed and China wood oil, together with drier, mineral spirits, and chrome green as a pigment, changed upon standing to a gummy mass. Mechanical working failed to liquefy it, as did the addition of linseed oil, mineral spirits, turpentine, etc. Spontaneous liquefaction occurred, however, upon the addition of 20% of a calcium resinate solution in benzene. The acid No. of this solution was 75 and the author attributes its peptizing action to this, since similar solutions of a glycerine resin ester, (acid No. 7.2), and of a coumarone resin, had practically no action upon the gel. The varnish has since remained unchanged for approximately six months." From Paint Varnish Production Mgr.

Myers, J. E., Kass, J. P., and Burr, G. O.

COMPARATIVE RATES OF OXIDATION OF ISOMERIC LINOLENIC ACIDS AND THEIR ESTERS.

Oil & Soap 18, 107-9 (1941); C. A. 35, 4233 (1941).

"The max. velocities of O₂ absorption as measured by the Warburg-Barcroft respirometer at 40° and expressed as mols. O₂/mol. substance 100 min. for a series of octadecatrienoic acids and their esters were: α-eleostearic acid 2.68; β-eleostearic acid 1.02; pseudo-eleostearic acid 0.64; Me pseudo-eleostearate 0.42; α-linolenic acid 0.52; Et. linolenate 0.24. The data showed the effect of spatial configuration as well as type of unsatn. and functional grouping on the oxidation reaction. The apparently pure fatty compds. were found to have induction periods, pointing to the autocatalytic nature of the oxidation reaction. 17 references." From C. A.

Narciso Castillo, G.

INTRODUCTION OF ALEURITES INTO THE REPUBLIC - ITS IMPORTANCE

Rev. agr. y com. (Segunda época) Ciudad Trujillo. República Dominicana 27 (78), 2312-13; (79), 2365-66; (80), 2413-14; (81), 2465-66 (1936).

Nauroy, A.

DRYING OILS AND DRYING.

Peintures, pigments, vernis 17, 635-9 (1942); C. A. 40, 5577 (1946).

Eleostearic acid is mentioned as a constituent of conjugated oils.

Neff, M. S., and O'Rourke, E. N., Jr.

FACTORS CONTRIBUTING TO THE GROWTH OF NEWLY TRANSPLANTED TUNG TREES.

Proc. Am. Soc. Hort. Sci. 54, 40-46 (1949)*

Neff, M. S., and O'Rourke, E. N., Jr.

F-578, A PROMISING NEW TUNG PROGENY.

Proc. Am. Tung Oil Assoc. 1949, 48-51.

"Because of their ability to crown freely and to increase rapidly the number of terminals, seedling tung trees of F-578 parentage produced over 30 pounds of fruit at the end of the fourth year in the orchard. In two comparative tests seedling trees of this progeny ranked first in production in a planting that included 53 budded varieties and 5 other seedling progenies. The F-578 is herewith added to the list of recommended seedling progenies." Summary from the article.

Neff, M. S., and O'Rourke, E. N., Jr.

A PROMISING NEW TUNG TREE DEVELOPED.

Tung World 4 (5), 8-10 (Sept., 1949).

"Because of their ability to crown freely and to increase rapidly the number of terminals, seedling tung trees of F-578 parentage produced over 30 pounds of fruit at the end of the fourth year in the orchard." From the authors' summary.

Neff, M. S., and O'Rourke, E. N., Jr.

A GOOD ROOT SYSTEM IS MOST IMPORTANT.

Tung World 5 (6), 12-3 (Oct., 1950).

"--in old, highly productive orchards large masses of fibrous tung roots are present near the surface of the soil. These roots are especially brought to the attention of the grower during cultivation, when implements expose large numbers of them to view. Although the root system of the tree extends to a considerable depth, the fibrous roots are most abundant in the upper level of the soil. This mass of fibrous roots represents a rather small portion of the total weight of roots produced by a tree, but the importance of these roots to the tree is out of proportion to their weight. They are of vital importance in the absorption of moisture and nutrients. Frequent shallow cultivation is advisable to destroy weed growth with minimum loss of fibrous roots." From the authors' summary.

Neff, M. S., O'Rourke, E. N., Jr., and Potter, G. F.

LAMPION VARIETY TREE HIGHLY PRODUCTIVE

Tung World 4 (9), 14 (Jan., 1950).

The Lampton variety (formerly F-578) of tung tree has proven unusually productive.

Neff, M. S., O'Rourke, E. N., Jr., and Potter, G. F.

NEW TUNG VARIETY RELEASED FOR COMMERCIAL USE.

American Tung News 1 (4), 10 (Feb., 1950).

Negri, G. de, and Sburlati, G.

WOOD OIL.

L'Orosi 19, 291-8 (Sept., 1896); Societa liguistica de scienze naturali e geografiche. Atti (Genoa) 7, 181-8 (1896); Moniteur Scientifique (4) 11, 678-80 (1897); Chem. Zentr. 1897, I, 25-6.

"Wood oil is imported from Japan and comes from the seeds of a tree, of the botanical name Aleurites cordata, Elaeococca verrucosa, Aleurites Japonica, Dryandra cordata, oil tree of the Euphorbiaceae, and the Japanese names, Abura giri and Jani kiri. The authors describe the fruit of this tree, from the kernels of which they obtained by extraction 52.25% and by pressing 42% of oil. The oil is clear, colored somewhat yellow, of peculiar odor similar to the castor oils, tasteless and refractive. In the air the oil becomes solid in 24 hours. ***Wood oil serves in China for waterproofing wood, caulking barges, for varnishing furniture and treating fabrics. Japanese wood oil is not to be confused with Indian wood oil; the latter is obtained from Dipterocarpus turbinatus, D. laevis and D. indicus." Translated from Chem. Zentr.

Constants of the oil are also reported.

Nelson, H. A. (Am. Soc. Testing Materials, Comm. D-1, Sub Comm. III)
PHYSICAL PROPERTIES OF VARNISH FILMS INDICATED BY STRESS-STRAIN
MEASUREMENTS.

Am. Soc. Testing Materials Proc. 23, Pt. 1, 290-9 (1923).

"Differences in the physical properties of varnishes, depending on their composition and method of preparation, can be graphically demonstrated by means of stress-strain diagrams in such a manner as to indicate their probable field of usefulness."

Four varnishes were evaluated in this way.

"Varnish A ** is a China wood oil-ester gum product with 27 gal of oil to each 100 lb. of gum reduced with 47.4 per cent volatile consisting of 1/2 turpentine and 1/2 turpentine substitute. The stress-strain curves show the following characteristics similar to those previously observed for spar varnishes: 1. High distensibility which is affected only slightly by changes in absorbed moisture content, of the film. 2. High tensile strength, which is properly balanced by a well-maintained high distensibility **. 3. A very pronounced resistance to final rupture, indicating a decidedly tough, rubber-like structure."

"Varnish D ** is a China wood oil-limed rosin varnish with 27 gal. of oil to each 100 lb. of gum and reduced with 45.4 per cent of turpentine substitute. This varnish also has the distinct characteristics: 1. Very low distensibility even at high humidities. 2. High tensile strength, which with the low distensibility gives a poorly-balanced curve.** 4. Absolutely no evidence of a final increasing resistance to rupture." From the article.

Nicolet, Bon H.

C₁₈ FATTY ACIDS. THE NON-IDENTITY OF ELEOSTEARIC ACID TETRABROMIDE FROM TUNG OIL WITH ORDINARY LINOLIC ACID TETRABROMIDE. J. Am. Chem. Soc. 43, 938-40 (1921); C. A. 15, 1723 (1921).

"Alpha-eleostearic acid, prep'd. by sapon. of tung oil and crystn. from alc., m. 48°; 10 g. treated in low-boiling ligroin with Br gives 9.8 g. of a dibromide, m. 85°, discolors noticeably in 24 hrs. and becomes completely black in a few days. From 20 g. of the acid in 100 g. AcOH at 5-10° treated with 4 equivs. Br is obtained 2 g. of the tetrabromide, m. 115°, apparently identical with Kametaka's product (J. Chem. Soc. 83, 1042 (1903), but when mixed with linolic acid tetrabromide (m. 114°) from cottonseed oil, it softens 100° and m. 103°.

Beta-eleostearic acid brominated in the same manner gives Morrell's tetrabromide, m. 115°, which is identical with the alpha-tetrabromide, as shown by mixed m. ps. Ethyl alpha-eleostearate tetrabromide, crystals from alc., m. 50° (the corresponding linolate m. 63°). Since the alpha-eleostearic and linolic acid tetrabromides are thus shown not be identical it is no longer necessary to assume that the acids themselves are stereoisomers." From C. A.

Nievas, J. A.

IMPROVEMENT OF TUNG.

Argentina Min. de Agr. Not. 12, 151 (May 31, 1947)*; Bibliog. of Agr. 11, No. 20, 863 (1947).

Norris, D., and Bates, H. T.

NOTES ON THE ESTABLISHMENT OF ALEURITES FORDII (TUNG OIL) IN THE RANCHI DISTRICT, CHOTA NAGPUR.

Rev. botan. appl. et agr. trop. 11 (119), 609-610 (1931).

Obst, Walter

WOOD OIL AND ITS MANY USES.

Allgem. Oel-u. Fett-Ztg. 24, 401-2; Chem. Zentr. 1927, II, 1631;

C. A. 22, 3546 (1928) (no abstract).

Primarily a discussion of its uses in varnishes and enamels.

Oil and Colour Trades Journal

TUNG OIL AND TUNG OIL MIXTURES.

"Drying Oils and Driers." London, 1934, pp. 58-66.

Some information regarding the production of tung oil and a general discussion of the processing (cooking, blowing, etc.) of the oil, both alone and in mixtures with other oils.

Opsahl, J. M.

THE "CHINAWOOD OIL" TREE.

Am. Childhood 33 (9), 61 (May, 1948)*; Bibliog. of Agr. 12, No. 37,608 (1948).

Oswald, F. G.

RESEARCH ON THE GASPROOFING OF TUNG OIL WITH SPECIAL PIENOLICS.

Official Digest Federation Paint & Varnish Production Clubs

No. 308, 667-74 (Sept., 1950).

The gasproofing of tung oil alone and in the presence of various resins has been investigated. Procedures and equipment for testing for gasproofness are given. Some information about the chemical changes resulting from heating tung oil with different resins is furnished by ultraviolet absorption curves for the varnishes.

Otte, N. C.

DR. SINGER'S PAPER: REACTIONS BETWEEN OIL-REACTIVE ALKYLPHENOL RESINS AND DRYING OILS.

Kemisk Maanedsblad 23, 89-96 (1942)*; Chem. Zentr. 1942, II, 2537; C. A. 38, 3858 (1944).

"Polemical" (Cf. C. A. 37, 5876). R. J. R. Singer reports on supplementary expts. on heating tung oil in the presence of air and in a CO₂ atm., and on detns. of the diene no in alkylphenol resin and paraffin-oil solns.; on heating tung oil with oil-soluble alkylphenol resins that do not react with the oil; and on the detn. of the I no. in the heating of linseed oil and stand oil, because the diene no. cannot be detd., owing to stable emulsions." From C. A.

Ou, Shih-Kuang

A STUDY OF THE CERCOSPORA LEAF-SPOT OF TUNG OIL TREE.

Sinensia 11 (3/4), 175-88 (1940)*; Biol. Abstracts 16, 1012, Abs. No. 10, 875 (1942).

"An account of the pathogenicity and life history of Mycosphaerella alcuritidis (Cercospora a. Miyake) on Aleurites cordata in Szechwan. The conidial stage occurs from late in the growing season to the end, spermogonia and perithecia being formed on fallen diseased leaves, destruction of which constitutes the method of control. Inoculation is by ascospores or conidia." From Biol. Abstracts.

Oudot, M.

CHINA WOOD OIL AND ITS PRODUCTION IN INDOCHINA.

Agron. coloniale (Paris) 23 (203), 138-147 (1934)*; Bull. Imp. Inst. 33, 93 (1935).

Painter, J. H., Drosdoff, M. and Brown, R. T.

RESPONSES OF BEARING TUNG TREES ON RED BAY FINE SANDY LOAM TO POTASSIUM AND NITROGEN.

Proc. Am. Soc. Hort. Sci. 52, 19-24 (Nov., 1948); Proc. Assoc. Southern Agr. Workers 45, 124 (1948) (abstract).

"In an extensive experiment in which tung trees were supplied with three levels of each of the three elements, nitrogen, phosphorus and potassium, over the period 1943-46, yields were increased most promptly and to the greatest extent through the use of nitrogen, but ultimately highest yields were obtained where nitrogen was used in combination with potassium and phosphorus. Increased yields were associated with greater growth of trees, increased numbers of shoots, and a higher number of pistillate flowers per terminal bud.

Oil in the kernel tended to be decreased by the use of nitrogen and increased by the use of potassium. The percentage of kernel in the whole fruit was increased by both nitrogen and potassium. The net result was a substantial increase in oil in the whole fruit where nitrogen and potassium were used." From Proc. Assoc. Southern Agr. Workers (abridged).

Painter, J. H., and Neff, M. S.

HOW TO GROW A GOOD VASE-FORM TREE.

Proc. Am. Tung Oil Assoc. 1948, 35-9; Biol. Abstracts 23, 213 Abs. No. 1845 (1949).

Palma, D.

TUNG OIL HAS NO SUBSTITUTE.

Chacra 17 (203), 98 (Sept., 1947)*; Bibliog. of Agr. 11, No. 39, 971 (1947).

Perrot, Emile, and Khouvine, Yvonne

THE ALEURITES PRODUCERS OF DRYING OILS CALLED "WOOD OILS."
Travaux de l'Association "Colonies-Sciences"; Notice No. 2,
50 pp., 1926. Bull. Imp. Inst. 25, 96-7, (1927).

Phillips, Max

VANILLIN FROM THE SHELLS OF TUNG NUTS.

J. Assoc. Official Agr. Chem. 27, 125-127 (1944); Brit. Chem.
Abstracts 1944, B, III, 163.

"The max. yield of vanillin (1), determined by Pritzker and
Jungkunz' modification of Hanus' method, was 3.2% of the wt.
of shell, or 6.4% of the lignin content. The yield of (1)
separated as such was 1.5% of the wt. of shell." From Brit. Chem.
Abs.

Pires, F. F.

CULTURE OF ALEURITES (REPORT OF A STUDY TRIP TO NYASALAND IN
1943).

Agres (Lisboa) 32, 30-40 (Jan./Feb., 1949) (in Portuguese).*

Pires, F. F.

CULTURE OF ALEURITES.

Gaz. do Agricultor (Mozambique) 1 (7), 151-2 (1949); Oleagineux
5 (4) 275 (1950).

"Botanical description of Aleurites fordii, Aleurites montana,
and Aleurites cordata. Distribution of these species in the
world. Only Aleurites montana is cultivated at Mozambique.
Conditions of soil and of climate required by the different
species. A table of rainfall at Mozambique" Translated from
Oleagineux.

Pires, F. F.

CULTURE OF ALEURITES.

Gaz. do Agricultor (Mozambique) 2, 10-1 (Jan., 1950), 30-4
(Feb., 1950) (in Portuguese).*

Poey, F.

TUNG OILS AND THE POSSIBILITY OF GROWING ALEURITES TRISPERMA
IN CUBA

Congr. Nac. Ingen. Agron. y Azucarera. Trab. Tec. y Discursos
1948 (2), 219-37 (1949).

Potter, G. F.

ORCHARD CULTIVATION BY A TESTED METHOD.

Proc. Am. Tung Oil Assoc. 1946, (2), 15-7, Tung World 1 (4),
8 (Aug., 1946).

The spring-tooth harrow leaves the ground in good condition
for harvesting tung fruit.

Potter, G. F.

SOME FACTS ABOUT TUNG NURSERY STOCK, BUDDED AND SEEDLING.

Proc. Am. Tung Oil Assoc. 1948, 29-34; Biol. Abstracts 23, 213,
Abs. No. 1847 (1949).

Potter, G. F.

FIELD EXPERIMENTS FOR YIELD DETERMINATIONS. DESIGN OF FIELD
EXPERIMENTS IN TUNG ORCHARDS.
Conf. Statist. Appl. Res. Social Sci. Plant Sci. and Animal Sci.
Proc. 1948 (i.e. 1949), 45*; Bibliog. of Agr. 14, No. 18, 923
(1950).

Potter, G. F.

PROPER SPACING OF TUNG TREES.

Tung World 4 (8), 9-10 (Dec., 1949).

"In the present state of our knowledge the writer is inclined
to expect maximum return per dollar invested from a hedge row
planting of trees about 12 feet apart in a row with rows 25 to
35 feet apart, as the grower may desire." Summary at the end
of the article.

Potter, G. F.

PLANTING DISTANCES IN THE TUNG ORCHARD.

American Tung News 1 (3); 5-6 (Jan. 1950).

Similar to "Proper Spacing of Tung Trees" by G. F. Potter
(Tung World 4 (8), 9-10 (Dec., 1949)).

Potter, G. F.

FROST HAZARD IN TUNG ORCHARDS.

Tung World 5 (3), 12-4 (July, 1950).

The frost hazard to tung growing can be reduced by (1) planting
only on sites having adequate air drainage, (2) clearing timber
to improve air drainage from established tung orchards, (3)
proper fertilization (use of K in proper balance with N) and
diversification of enterprises.

Potter, G. F., and Crane, H. L.

SOIL MANAGEMENT IN THE TUNG ORCHARD.

Tung World 5 (10), 13, 15-7 (Feb., 1951).

Proper cultivation, fertilization and the use of cover crops
are recommended.

Potter, George F., Lagasse, F. S., and Painter, J. H.

PROBLEMS OF TUNG PRODUCTION.

Proc. Am. Tung Oil Assoc. 1940, 18-21.

The tung industry is still faced with problems of propagation,
pruning, fertilization and other cultural practices.

Potter, G. F., and Merrill, S., Jr.

BUILDING THE TUNG TREE.

Tung World 1 (4), 12 (Aug., 1946).

Ranker, E. L.

THE TUNG OIL INDUSTRY.

Natl. Paint Bull. 10 (3) 5-6, 8-9, 12, 18 (1946).

Rasquin, H.

LINSEED OIL VARNISHES. WOOD OIL VARNISHES. CELLULOSE LACQUERS.
A CROSS SECTION.

Farben-Ztg. 31, 91-2 (1925); C. A. 20, 298 (1926).

"A comparative review of the properties and uses of these different types of varnish coatings." From C. A.

Rauber, E. L.

THE TUNG OIL INDUSTRY. GROWTH AND PROSPECTS.

Fed. Reserve Bank Atlanta Monthly Rev. 30, 121-8 (Nov. 30, 1945);

Chemurg. Digest 5, 49, 51-58 (Jan. 31, 1946).

A economic and technical review of the tung industry in the U. S. Acreages, yields, oil expression and solvent extraction of oil are included.

Rayment, T.

OIL OF TUNG.

Walkabout 11 (50), 31-2, 34 (Mar. 1, 1945)*; Bibliog. of Agr. 10, No. 11, 651 (1947).

Reed, I. F.

ENGINEERING PROBLEMS IN DRYING PEANUTS AND TUNG NUTS.

U. S. Bur. Agr. and Indus. Chem., Washington, 2 pp. (1948)*;

Bibliog. of Agr. 12, No. 61, 662 (1948).

Reihl

CHINESE WOOD OIL TESTS

Oil, Paint Drug Reptr., Jan 6, 1913*; J. Soc. Chem. Ind., 32, 243 (1913) (abstract); C. A. 7, 2861 (1913).

"For detection of adulteration, the author makes use of the waterproof character of dried films of Chinese wood oil. The sample of oil is heated quickly to 260°, cooled (so that it does not polymerize), mixed with 1% of the linolate of Co or Pb, and spread on a piece of glass. After 36 hrs. the glass, with the dried film, is immersed in water for 12 hrs. Films from pure wood oil remain clear and bright and opaque according to the degree of adulteration. For detg. the amt. and nature of the adulterant, the oil is placed in a shallow vessel which is introduced into an oil bath at 290°. The temp. of the bath is allowed to fall to 280° and is kept at that pt. for 12-15 mins., until the oil has solidified to a hard mass. The latter is removed from the vessel, crushed, weighed, and the adulterant recovered from the insol. polymerized wood oil by extn. in a Soxhlet with petroleum spirit." From C. A.

Ringuolet, R.

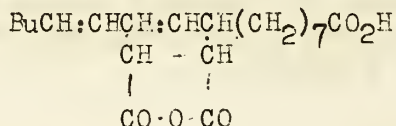
TUNG.

Campo y Suelo Argentina 30 (365), 26-7 (Mar., 1947)*; Bibliog. of Agr. 11, No. 1776 (1947).

Rinkos, I. J.

ADDITION COMPOUND OF β -ELEOSTEARIC ACID AND MALEIC ANHYDRIDE.
Rec. trav. chim. 62, 557-60 (1943) (in German); C. A. 38, 2009 (1944). [See also abstract p. 370]

"The structure (I) suggested for the addn. compd. (C. A. 26, 5545) is examd. by treatment of 7.5 g. I with 6 g. Zn dust and 18 g. Ba(OH)₂ at 360-400°/10-15 mm. The product obtained has the formula C₁₉H₃₂, b₁₀ 185-7°, m. -40°, and yields terephthalic acid when oxidized with CrO₃ in glacial AcOH. This is in accordance with I. C₁₉H₃₂ was expected to be 1-hexyl-4-heptyl benzene (II). In order to confirm this assumption II was prepd.



from p-iodoheptylbenzene (III) and iodoheptane. III was obtained in 23-g. yield by adding slowly to 18 g. p-heptylaniline in 45 g. concd. HCl and 135 cc. H₂O a soln. of 6.7 g. of NaNO₂ and then a soln. of 24 g. KI in the double amount of H₂O. The sepd. oil was dissolved in Et₂O, washed with Na₂S₂O₃ soln. and soda soln. and distd. in vacuo. III b₁₀ 165°. 18 g. III and 18 g. Mo(CH₂)₅I were refluxed 12 hrs. with 10.8 g. Na and 80 cc. benzene. After sepn. from NaI and Na 2.2 g. C₁₉H₃₂ were obtained, b₁₀ 185-7°, M. -32°. Equal parts of the synthetic II and II obtained from I m. -35 to -32°. This result confirms structure I." From C. A.

Robert, J. C.

THE FORCING OF DORMANT BUDS. AN IMPORTANT FACTOR IN PROFITABLE PRODUCTION OF TUNG NUTS.

Proc. Am. Tung Oil Assoc. 1942, 13-4.

Dormant buds on lower parts of the trunk and limbs of tung trees develop into limbs or fruit buds as soon as (1) the ends of the original limbs are killed by frost or are amputated or (2) circulation is cut off by a wound above the dormant bud. (For details of the latter operation, cf. Mississippi State Agr. Expt. Sta. 54th Ann. Rept., June 1941, and Circular No. 102.

Rowlands, Lamont

TUNG OIL

Proc. 2nd Dearborn Conf. Agr. Ind. Sci. 1936, 51-55.

A general review of the culture of the tung tree and of markets and uses for the oil. Trees furnish a profitable crop on cut-over pine lands of the South when most other crops are unsatisfactory

Ruprecht, R. W.

CHINESE TUNG NUTS.

Florida Agr. Expt. Sta. Ann. Report 1924, 53-5; C. A. 20, 3319 (1926).

"Two samples of Chinese tung oil nuts, Aleuritis moluccana and A. fordii, analyzed as follows: meats, 31.45 and 60.2%; hulls, 68.55 and 39.8%; moisture in meats, 38 and 36.5%; oil in meats, 58.2 and 57.15%; and oil in whole nuts, 18.33 and 34.3%. A. fordii is considered the better variety." From C. A.

Russell, W.

THE ALEURITES PRODUCERS OF OILS.

Rev. botan. appl. et agr. trop. 14 (153), 335-337 (1934).

Sands, W. N.

CANDLENUT AND CHINESE WOOD OIL TREES.

Malayan Agr. J. 12 (1), 1 (Jan., 1924).

Santos Leal, Armando dos

TUNG (ALEURITES FORDII).

São Paulo (State) Sec. da Agr., Ind. e Com. 38 pp., 1933*; Biol. Abstracts 9, 1841, Abs. No. 16,672 (1935).

"An account of the propagation and cultivation of the tung-oil tree, mostly compiled but illustrated with local photographs. Large areas of the State of São Paulo should be suitable, although the culture in this region is still in the early stages of experimentation." From Biol. Abstracts.

Sarx, H. F.

RAW MATERIALS IN THE COATING INDUSTRY.

Farben, Lack, Anstrichstoffe 2, 215-23 (1948); C. A. 43, 2787 (1948).

Scheiber, Johannes

THE DETERMINATION OF WOOD OIL.

Chem.-Ztg. 52, 471 (1928).

Methods of precipitating α -eleostearic acid, its K or Mg soaps and β -eleostearin are mentioned. Details are given for treating a tung oil composition with $ZnCl_2$, grinding the product with sand and extracting with ether to determine the insoluble fraction.

Scheiber, Johannes

ON THE CONSTITUTION OF ELEOSTEARIC ACID.

Farbe u. Lack 1928, 146.

A supplement to the article by the same author in Farbe u. Lack 1927, 646-7. Eleostearic acid consists of a triply conjugated system, as is indicated by its halogenation, hydrogenation and oxidation.

Scheiber, Johannes

NEW STUDIES OF THE FATTY OILS.

Farbe u. Lack 1930, 51-3, 63-5*; C. A. 24, 2314 (1930).

A review of the mechanisms of drying of tung and other oils.

Scheiber, Johannes

POSSIBILITY OF JUDGING ANTIOXIDATION EFFECTS.

Farbe u. Lack 1947, 29-31, 50-2; C. A. 42, 7548 (1948).

Schmid, Fritz

THICKENING AND SETTLING IN PIGMENTED VARNISHES.

Farbe u. Lack 1933, 172-3, 185-6; C. A. 27, 3349 (1933).

"The causes of the thickening of paints lie in the kind of free oil and resin acids, kinds of colloidal phases, etc." From C. A.

Wood-oil stand oils often cause storage difficulties.

Scott, J. M.

TUNG OIL. A NEW INDUSTRY IN AMERICA.

Paint Varnish Production Mgr. 26-8, 30 (Nov. 1929).

Excerpts from Florida Dept. of Agr. Bull. No. 11 (1929) by the same author.

Seaton, M. Y., and Sawyer, G. B.

VARNISH ANALYSIS AND VARNISH CONTROL. I. MOLECULAR WEIGHTS OF VEGETABLE OILS.

J. Ind. Eng. Chem. 8, 490-3 (1916); C. A. 10, 1938 (1916); Chem. Zentr. 1918, 1, 576.

"Detns. of mol. wts. of linseed oil, tung oil, etc., by f. p. methods in C_6H_6 and $CHCl_3$ give very variable results, dependent on the concn. of soln. Triple pressed stearic acid dried in a steam oven and used as solvent in the f.p. method gives very concordant mol. wts. with a variety of raw and treated oils, varnishes, etc., the difficulty caused by the stearic acid crawling up the stirrer and sides of the vessel of the app. ordinarily used is overcome by use of a cover with an electrically heated asbestos pad maintained at about 60°. Results obtained by the various methods are tabulated." From C. A.

Sell, H. M., and Johnson, F. A., Jr.

BIOCHEMICAL CHANGES IN TERMINAL TUNG BUDS DURING THEIR EXPANSION PRIOR TO BLOSSOMING.

Plant Physiol. 24, 744-52 (1949).

Biochemical changes occurring in the tung bud late in the dormant period and during the period of rapid expansion of the inflorescence were followed by periodic determinations of carbohydrates, nitrogen compounds, lipids and ash.

Severson, Harold

Boom in the tung Belt [of southern U. S.].

South Agr. 74 (7), 6-7, 16 (July, 1944)*; Bibliog. of Agr. 5, No. 7041 (1944).

Severson, Harold

FINANCING OUR OWN TUNG OIL.

Banking 38 (4), 69 (Oct., 1945)*; Bibliog. of Agr. 8, No. 4324 (1946).

Shanghai Commercial & Savings Bank

TUNG OIL.

Pub. by Shanghai Commercial & Savings Bank, 1930 (in Chinese)*.

Sharpe, R. H., and Merrill, Samuel, Jr.

STRATIFICATION IMPROVES GERMINATION OF TUNG NUTS IN THE NURSERY
Proc. Am. Tung Oil Assoc. 1942, 11-2.

"Stratification was accomplished by placing the seed in layers in clean sand under moist but well drained conditions."

"Stratification is of definite aid in hastening and improving the germination of tung seeds. It is of especial value with the seeds of trees that naturally germinate slowly."

Sharpe, R. H., and Merrill, Samuel, Jr.

EFFECT OF STRATIFICATION AND TIME OF PLANTING ON GERMINATION OF TUNG SEED.

Proc. Am. Soc. Hort. Sci. 40, 286-291 (1942).

Similar to "Stratification Improves Germination of Tung Nuts in the Nursery" by the same authors (Proc. Am. Tung Oil Assoc. 1942, 11-2).

Shear, C. B. and Crane, H. L.

NUTRIENT-ELEMENT BALANCE.

Yearbook of Agriculture (U. S. Dept. of Agr.) 1943-47, 592-601.

By making analyses of tung leaves it is possible to detect deficiencies of Mn, Ca, Mg, Cu and Zn.

Shear, C. B., and Crane, H. L.

GERMINATION OF NUTS OF THE TUNG TREE AS AFFECTED BY PENETRANTS, SUBSTRATE, DEPTH OF PLANTING AND STORAGE CONDITIONS.

Bot. Gaz. 105, 251-6 (1943); Biol. Abstracts 18, 1009, Abs. No. 9200 (1944). See p. 46 for abstract.

Shear, C. B., Crane, H. L., and Myers, A. T.

NUTRIENT-ELEMENT BALANCE. A FUNDAMENTAL CONCEPT IN PLANT NUTRITION.

Proc. Am. Soc. Hort. Sci. 47, 239-48 (1946); Biol. Abstracts 21, 714, Abs. No. 7186 (1947).

"Based on the authors' work on tung and data obtained from the literature on numerous other spp., the following concept is proposed and defended. All other factors being constant, plant growth is a function of the 2 variables of nutrition, intensity and balance, as they are reflected in the composition of the leaves when the plants are in the same stage of growth or development." From Biol. Abstracts.

Sheets, V. N.

CINCINNATI-DAYTON-INDIANAPOLIS CLUB PRESENTS A STUDY OF TREATED WOOD OILS

Am. Paint J. 19 Convention Daily 9 (Oct. 29, 1935)*; Paint Varnish Production Mgr. 13, 17, 18-19, 37 (Nov. 1935)*; Paint Oil Chem. Rev. 97 (23), 70, 72; C. A. 30, 306 (1936).

For treated wood oils in modified phenolic resin varnishes with 20- and 33-gal. oil lengths are compared with raw wood oil in similar varnishes. In addition treated and raw wood-oil films are compared for relative gasproofness. Conclusions: (1) treated oils are inferior to raw oils in cooked varnishes as to drying and durability; (2) treated oils have less gasing tendency at the expense of drying; (3) treated oils have lost some of the valuable characteristics of the raw oil making them more closely related to linseed and perilla oils, and (4) treated oils with progressive fume proofness have progressing increase in acid value, drying time and miscibility with progressive darkening.

Shen, T. H.

COMPARATIVE STUDY OF VARNISHES MADE FROM DIFFERENT DRYING OILS. Chiao-Tung Univ. Research Inst. Shanghai, Ann. Rept. Bur. Chemistry (6) 2, 59-61 (1935) (in Chinese)*.

Shen, T. H.

STILLINGIA OIL AS A SUBSTITUTE FOR TUNG OIL.

Chiao-Tung Univ. Research Inst. Shanghai, Ann. Rept. Bur. Chem. 3, 17-26 (1936)*; C. A. 31, 3309 (1937).

"Stillingia oil (1) absorbs more O than linseed oil. Within the range of 0.1-0.25% of driers added to the oil, the oil oxidizes and dries better with increasing amts. of driers. Combined driers have greater effect on the drying of this oil and fewer driers can be used. Heat bodying of this oil at 280° increases its viscosity immensely. Although this oil does not polymerize so readily as tung oil, it is more easily bodied than linseed oil. Paints made with 1 as vehicle are better than those made with linseed oil and varnishes made from 1 are just as good as those made from tung oil. 1 also has no livering action toward basic pigments." From C. A.

Shu, C. F.

TUNG OIL PRODUCTION OF CHEKIANG PROVINCE.

Science (China) 16, 1158-63, 1306-20 (1932) (in Chinese)*.

Silva, E. M.

INVESTIGATION OF TUNG PLANTATIONS.

Bolsa de Cereales, Buenos Aires. Rev. 32 (1704), 6,8,16 (June 9, 1945)*; Bibliography of Agr. 7, No. 13,871 (1945).

Statistics of the industry.

Sinclair, J. M.

CATTLE AUGMENTS TUNG FARMERS' INCOME.

Tung World 1 (1), 8 (Apr., 1946).

The grazing of cattle on cover crops in tung orchards is recommended.

Singer, R. J. R.

THE REACTION BETWEEN OIL-REACTIVE ALKYLPHENOL RESINS AND DRYING OILS. II. INVESTIGATIONS ON LACQUER.

Kemisk Maanedstidning 23, 49-61 (1942)*; C. A. 37, 5876-7 (1943);

Chem. Zentr. 1942, II, 717.

"After a review of the contradictory work and reactions taking place on cooking oil-reactive phenol resins with drying oils, S. finds that the conjugated double bonds of China wood oil, detd. by the aid of the dione no., and the double bonds of linseed oil, detd. by the I no., are more strongly consumed on cooking than with pure oil. Differences are found with different phenol resins. It is shown by tests that the reactivity can be attributed neither to free alkylphenols in the resin nor to CH_2O split off. The theory is advanced that the methylquinone formed during the hardening of the phenol resins, as philodiene component, undergoes reaction with the double bonds of the oil." From C. A.

Sitton, B. G., Painter, J. H., and Brown, R. T.

INCREASING TUNG PROFITS WITH POTASSIUM.

Better Crops with Plant Food 33, 21-4 (1949)*; Soils and Fertilizers 12 (4), 303 (1949) (abstract)*; Oleagineux 4 (12), 773 (1949).

"The application of 0.16 lb. of N per tree on soils relatively rich in K increases the yield but lowers the % oil after 3 to 5 years. The application of 3:4 of K in relation to the N applied maintained the % oil at 21%." Translated from Oleagineux.

Sitton, B. G., Painter, J. H., Brown, R. T., Gilbert, S. G., and Drosdoff, M.

INCREASING TUNG PROFITS WITH POTASSIUM.

Am. Tung News 1 (4); 6-7 (Feb., 1950).

Skipper, H. E., and Lazier, W. A.

OPPORTUNITIES FOR RESEARCH IN THE TUNG INDUSTRY.

Proc. Am. Tung Oil Assoc. 1947, 86-8.

Research along a number of lines might prove profitable to the tung industry but the utilization of the meal and of the by-products it contains is most promising at present.

Smee, Colin

NOTES ON A FEW INSECTS ATTACKING TUNG NUT TREES.

Nyasaland Tea Assoc. Quart. J. 5 (2), 13-7 (1940)*; Biol. Abstracts 15, 1847, Abs. No. 20,071 (1941).

"No serious insect pest has yet appeared in tung-tree plantations in Nyasaland. Notes are given on a number of insects and the minor damage they cause to tung trees. These insects include an unidentified twig girdler; 2 leaf-eating caterpillars, Orgyia mixta and Niphaelepis alianta; 2 leaf-eating beetles, Exora apicipenne

and Isanaris ater; scale insects, the most important being Icerya purchasi, Pulvinaria jacksoni, Aspidiotus hederæ, and Pseudococcus longispinus; and termites, which are stated to sometimes attack tung trees and kill them." From Biol. Abstracts.

Smoe, Colin

CLUSTER BUG ON TUNG (AGNOSCELIS PUBERULA, STAL.)

Nyasaland Agr. Quart. J. 3 (4), 25-6 (1943)*; Bibliog. of Agr., 4, No. 20,518 (1944).

Smith, W. G.

USE CRUDE METHODS TO EXTRACT OIL.

Foundry 53, 555 (July 15, 1925).

A description of native Chinese methods for extracting tung oil.

Smits, M. B.

TUNG OIL: A NEW PLANTATION CROP.

Intern. Rev. Agr. 22, 297T-308T (1931)*; Bull. Imp. Inst. 30, 84 (1932).

"A summary of recently-published information on tung oil cultivation in various countries." From Bull. Imp. Inst.

Souza, A. H. do

TUNG OIL.

Chacaras e Quintais 81, 195-8 (Feb. 15, 1950) (in Portuguese)*.

Steger, A. and Loon, J. van

POLYMERIZATION OF FATTY OILS. VIII. THE HYDROGENATING OF LINSEED AND WOOD OIL STAND OILS.

Rec. trav. chim. 54, 433-42 (1935); C. A. 29, 5293 (1935).

"The work on linseed oil stand oils shows: Although the hydrogenated product does not take up more H_2 , it retained 45.5% of its unsatn. as proved by the $KMnO_4$ test. No addnl. H_2 is taken up even when hydrogenated at 100 atm. and 180°. Since the satd. acids isolated showed practically no I no., it was concluded that the constituents of the hydrogenated fat acids which take up halogens (I no. test) were oxidized by the $KMnO_4$. Evidence (i.e., n.m.p. and analysis) is presented which indicates that a liquid satd. acid is contained in the satd. acids in addn. to the stearic acid. Results on hydrogenating wood oil stand oil were similar to those on linseed oil; they deviated only because of the eleostearides present in the wood oil. Conclusion: Neither the newly formed highly dispersed constituents nor the characteristic polymers allow themselves to be reduced to stearic acid derivs. Polymerization deals with chem. and not phys. changes of mols." From C. A.

Stewart, J. R.

THE SUBSTITUTION OF TUNG OIL.

Drugs, Oils & Paints 52, 404-5 (1937)*; C. A. 32, 372 (1938).

"A discussion of certain raw materials possessing interesting properties for substitution for tung oil. Included are: oiticica oil, lumbang oil, Chia (Mexican) oil, Isoline -- a new synthetic drying oil with individual properties. The latter oil is free from linolenic acid. It is characterized by no sudden gelling in the varnish kettle. Comparative consts. of Hankow tung oil and of Isoline are, resp.: acid no. 4-8, 3-5; sapon. no. 190-197, 190-195; I no. (Wijs -- 1 hr.) 163, 150-155; d_{20} 0.9406-0.9444, 0.9305; n_{20} 1.511-1.551, 1.4814; color (Pfund scale) --, 25-35 mm.; odor pronounced, negligible." From C. A.

Stockar, A.

PRELIMINARY COMMUNICATION ON HYBRIDIZATION BETWEEN DIFFERENT SPECIES OF ALEURITES.

Rev. argentina agron. 14, 33-8 (1947)*; Plant Breeding Abstracts 18 (1), 129 (1948)*; Oleagineux 4 (1), 53 (1949).

"Description of the leaves, of the nectar glands, of the inflorescences, of the course of flowering and of the fruits of: A. fordii x A. cordata, A. fordii x A. montana, A. montana x A. cordata and of 3 hybrids of reverse crosses." Translated from Oleagineux.

Stutz, G. F. A.

SPECTROPHOTOMETRIC MEASUREMENTS OF PAINT VEHICLES AND PIGMENTS IN THE ULTRAVIOLET.

J. Franklin Inst. 200, 87-102 (1925); Chem. Zentr. 1925, II, 1896; C. A. 19, 2569 (1925) (no abstract).

Ultraviolet absorption measurements were made on tung, linseed, soybean, lumbang, sunflowerseed, perilla, chia and castor oils, as well as bodied oils.

Sumner, R. J.

LIPID OXIDASE STUDIES. II. THE SPECIFICITY OF THE ENZYME LIPOXIDASE.

J. Biol. Chem. 146, 211-3 (1942); C. A. 37, 895 (1943).

"Lipoxidase from soybeans does not peroxidize allyl alcohol, mesityl oxide, linalool, elaidic and orucic acids. Oleic acid is peroxidized maximally in 5 min., 16% of the theoretical peroxidization takes place. Linoleic acid is peroxidized over 90%, α -eleostearic acid approx. 16%, and linolenic acid 95% of the theoretical peroxidation of one double bond. Conclusion: lipoxidase acts most effectively on the structure $RCH:CHCH_2CH:CH(CH_2)_7COOH$, the double bond nearer the COOH group being probably one of the cis-configuration." From C. A.

Sun, L. H.

EXPERIMENT ON DRYING OF TUNG NUTS.

Chiao-Tung Univ. Research Inst. Shanghai, Ann. Rept. Bur. Chem.
(6) 2, 37-9 (1935)*.

Sun, L. H.

SYNTHETIC OILS FROM TUNG-OIL ACID.

Chiao-Tung Univ. Research Inst. Shanghai, Ann. Rept. Bur. Chem.
(6) 2, 74-8 (1935) (in Chinese)*.

Taggart, M. F.

MIXING SOYBEAN OIL AND TUNG OIL.

Proc. 2nd. Dearborn Conf. Agr., Ind. Sci. 1936, 265-70.

Tung oil or blends of tung oil with soybean oil are bodied in a continuous process by passing the oil through a tube in which the oil is heated for a few seconds to temperatures up to 1000° F. The product makes a satisfactory non-frosting paint vehicle.

Taggart, M. F.

ADDRESS [INDUSTRIAL UTILITY OF TUNG OIL]

Proc. Am. Tung Oil Assoc. 1947, 55-7.

A brief discussion of uses of tung oil in protective coatings.

Talen, H. W.

SOME PRACTICAL TESTS WITH ISOMERIZED OILS.

Verfkronek 23, 80-2 (1950)*; C. A. 44, 5610 (1950).

"To det. the value of the new isomerized linseed oil (I), the latter and its standoil (II) were compared with original linseed oil (III), its standoil (IV), com. raw linseed oil (V), com. linseed oil-standoil (VI), com. raw tung oil (VII), and its standoil (VIII). The analysis gave, resp.: acid no. 0.16, 0.8, 0.35, 5.7, 3.2, 10.4, 4.4, 6.0 (mg. KOH/g.); conjugated fatty acids: diene 29.6, 19.4, 0.8, 4.4, ---, ---, ---, ---; triene 12.2, 2.0, 0.2, 0.3, ---, ---, ---, ---; tetraene 3.3, 0.2, 0.1, 0.0, ---, ---, ---, ---%; viscosity at 20°, P: 1.1, 41.3, 0.6, 38.0, 0.4, 55, 2.5, 75; appearance and clearness: contg. solid substances at room temp., clear liquid at 50°; turbid, clear liquid at 40°; clear, thin oil; clear at 40°; clear, thin oil; clear at 40°, clear oil; contg. flocks which do not disappear at 40°. Color: 9, sometimes greener; 4; 5; 7; 11-12; 11-12; 10; 11; heating test: does not break after heating, at 280° color much lighter; ---; does not break upon heating to 280°; ---; does not break upon heating to 280°; ---; ---; ---; Browne test: 2 hrs., less stiff than tung oil gel; 50 min., less stiff than tung oil gel; ---; ---; ---; ---; 11 min.; ---. In drying, chalking, and scorching tests the results of I and II lay between those of III and IV and VII and VIII." From C. A. For shorter abstract see p. 337.

Tang, T. H., and Hsuan, C.

A STUDY ON CRACKING OF VEGETABLE OILS.

National Peiyang Eng. Coll. Memoirs Eng. Research Inst. No. 6
(1936) (in Chinese)*.†

Reported to contain information on tung oil.

Taran, E. N.

THE CONSTANCY OF CHEMICAL PROPERTIES OF THE TUNG TREE.

Sovet. Subtropiki 1938 (3), 61-3*; Khim. Referat. Zhur 2 (3),
60 (1939)*; C. A. 34, 1051 (1940).

"Seeds of a tung tree contained oil 63.29, ash 2.57 and crude protein 17.87%. Seeds of a graft of this tree contained, resp., 64.07, 2.73 and 16.46%. The physicochem. consts. of oils obtained from the original trees and from the grafts varied only in limits of exptl. errors. The activities of the catalases of the original tree and of the graft were practically the same." From C. A. Also listed on p. 103.

Tarbox, J. P.

ADDRESS

Proc. Am. Tung Oil Assoc. 1948, 78-88.

There is described a tung fruit harvesting machine which depends on the "leaf spring wheel gathering principle." Fruit picked up by the wheels is detached from the wheels by a cam and falls into a hopper. A combination gatherer-huller has been designed.

Tatimori, Monzi

GELATION OF TUNG OIL. VI. EFFECTS OF ALIPHATIC ALCOHOLS.

J. Soc. Chem. Ind., Japan 43, Suppl. binding 139-40 (1940);

C. A. 34, 7126 (1940).

"Gelation is markedly retarded by glycerol in amts. of 5.26-20.6%. With cetyl alc. and oleyl alc. the relation of $1/t$ to x is curvilinear, with $x_{\infty} = 31$ and 32.5, resp. In general, the univalent alcs. have retarding effects similar to those of fatty acids. At 300° the gelation time with oleyl alc. and oleic monoglyceride reaches a min. and increases again with further rise in temp." From C. A.

Tatimori, Monzi

GELATION OF TUNG OIL. VIII. EFFECTS OF VARIOUS RESINS.

J. Soc. Chem. Ind. Japan 43, Suppl. binding 194-7 (1940); C. A.

34, 7630 (1940).

"Copal, dammar, amber, coumarone and neutral and sol. resins in general have some (mostly weak) retarding effects; with those named the relation of $1/t$ and x is linear. In the case of less sol. resins like mastic, leuchtol, phthalate resin, ester resin, sandarac and tamanol this relation is not linear. The influence of temp. on the gelation time of tung oil mixed with rosin is similar to that of fatty acid and here the relation $1/t:x$ is expressible by a quadratic equation." From C. A.

Tatimori, Monzi

GELATION OF TUNG OIL. XV. EFFECTS OF OXIDIZED PERILLA OILS AND BENZOYL PEROXIDE.

J. Soc. Chem. Ind. Japan 44, Suppl. binding 8-11 (1941) (in English); C. A. 35, 4616 (1941).

"Perilla oil, oxidized at 100, 200 and 300°, resp., was examd. for its effect upon the gelation of tung oil. With an oil oxidized at 300° a linear relation between $1/t$ and x was obtained; oils oxidized at 100 and 200° gave curved lines. This tendency was supposed to be due to the peroxide contained in the oils oxidized at low temps. To verify this presumption, the effect of benzoyl peroxide was studied; this substance proved to have a strong gelation-accelerating action. The effect of perilla oil added in mixt. with benzoyl peroxide is similar to that of perilla oil oxidized at low temp. The conclusion was drawn, therefore, that the curved nature of the $1/t$ vs x bearing of oxidized perilla oil is due to the effects of the retarding action of oxidized perilla oil and of the accelerating action of peroxide contained in this oil. The value of x increases with the increase of the cooking degree, similarly as in the case of cooked linseed oil." From C. A.

Taylor, W. M.

CHINA WOOD OIL.

U. S. Dept. Com. Misc. Series, Bull. 125, 21 pp. (1923).

The tung oil industry of China and the United States is reviewed under the following headings: (1) America's Dependence on the Chinese Product, (2) The Tree and its Culture in China, (3) Chinese Production and Extraction, (4) The Native Press and Its Operation, (5) Collecting and Marketing the Oil, (6) Transportation on the Yangtze River, (7) Collection and Distribution at Hankow, (8) Other Marketing and Export Centers, (9) Market Conditions, (10) Price Trends of China Wood Oil, (11) Present Day Aspects (in China), (12) Future Prospects (in China), (13) Forecast for the Season 1923-24, (14) Growth and Extent of Trade in China Wood Oil, (15) Tung Oil Developments in the United States, (16) Advantages of Domestic Production, (17) Methods of Cultivation, and (18) Technical Aspects.

Tchang, H. L., and Ling, C. L.

THE DRYING OF TUNG OIL

Bull. Natl. Acad. Peiping 6 (2), 21-34 (1935)*; J. Chem. Eng. (China) 2, 21-30 (1935)*; C. A. 29, 6443 (1935).

"The action of various driers on tung oil is very complicated, depending not only on the nature of the drier, but also on its quantity and the temp. and duration of the action. In the use of any specific drier, it is therefore necessary to dot. the optimum conditions for attaining the desired result. The best conditions for 18 common driers are tabulated." From C. A.

Tchang, H. L., and Ling, C. L.

THE DRYING OF TUNG OIL.

Bull. soc. chim. (5), 2, 1301-35 (1935).

Similar to "The Drying of Tung Oil" by TCHANG, H. L. and LING, C. (J. Chem. Eng. (China) 2, 21-30 (1935)*; Bull. Natl. Acad. Peiping 6 (2), 21-34 (1935)*.

Thone, Frank

TUNG TREES IN AMERICA. INTRODUCED HERE 30 YEARS AGO, RAPID-GROWING TREES FROM THE ORIENT GAIN ROOT-HOLD IN THE SOUTH.

Sci. News Letter 32 (849), 42-4 (July 17, 1937)*; Hennefrund, H. H.; and Colvin, E. M. (Comp.). The Soybean Industry (Agr. Econ. Bibliog. 74), U. S. Bur. Agr. Econ., Washington, D. C., 1938, p. 143.

"Contains a statement on pp. 43-44 on the fact that 'the tung-oil of the South is expected to form a vital link with the farming-for-industry movement in the North, through another oil plant that also came from China, the soy bean.' The soybean's greatest potential market is said to be its use as a paint ingredient. Used alone soybean oil is a slow drier. The addition of the required proportion of heat-treated tung oil greatly improves' the performance of the paint.'"

Toch, Maximilian

CHINA WOOD OIL.

Oil & Fat Inds. J. 3, 3-10, 52-9, 86-91 (1926).

Tochin, H. R.

PROGRESS REPORT. TREATED OILS.

Paint Manuf. 16, 186-9, 228 (June, 1946)*; Bibliog. of Agr. 9, No. 16,912 (1946).

Tošić, T. and Mooro, T.

CHEMICAL ESTIMATION OF VITAMIN E IN VEGETABLE OILS.

Biochem. J. 39, 498-507 (1945); C. A. 40, 3491 (1946).

"Weigh 1 g. oil in an Erlenmeyer flask, add 2 ml. 5% pyrogallol, heat to 86°, add 0.44 ml. KOH (4 g. KOH + 2.7 g. H₂O) and shake until sapon. is complete. Add 8 ml. H₂O and ext. the unsaponifiable matter by shaking vigorously with 2 portions of ether (10 and 5 ml.) in a separatory funnel. Wash the exts. twice with 5 ml. 0.5% KOH, then several times with 10 ml. H₂O. Evap. the ether ext. under reduced pressure, dissolve unsaponifiable residue in alc. (1-2 ml. of the alc. soln. should be equiv. to about 1 mg. FeCl₃-reducing substances). Evap. under reduced pressure to dryness and add amt. of alc. soln. equiv. to 1 mg. FeCl₃-reducing substances. Pack activated Al₂O₃ in a tube (120 x 10 mm.) to about a 50-mm. height. Pour through 10 ml. of a 1% EtOH in petr. ether. Dissolve the above residue in 5 ml. of the solvent, pour through the column and follow up with 15 ml. of the solvent. The rate of filtration through the column should be 70-90 drops/min. Measure 20 ml. of unadsorbed fraction, evap. to dryness under reduced pressure, dissolve

the residue in EtOH and adjust the vol. to not over 25 ml.. This fraction contains mainly carotene. Est. by the yellow color in a step photometer using S_{47} filter. To est. Vitamin E, pipet into a 25-ml. flask a portion of the soln. contg. 100-160 γ of the $FeCl_3$ -reducing substances. Add EtOH to make a 20-ml. vol., then 1 ml. of a fresh 0.2% $FeCl_3$ soln., 1 ml. of fresh 0.5% α , α' -bipyridyl soln. in alc. and make up to vol. with EtOH. A control is prepd. in the same way except that the unsaponifiable matter is left out. Shake and leave the flasks in a dark place for 15 min. Match the colors in the step photometer using S_{53} filter. The calcn. of the results is explained with the aid of an example. Tung oil with a high value of total reducing substances contained only 20% in the α -tocopherol fraction, while in wheat-germ oil this represents 60%." From C. A.

Treibs, Wilhelm

AUTOXIDATION OF OXYGEN-ACTIVE ACIDS. I. GRAVIMETRIC AND VOLUMETRIC FOLLOWING OF THE ADDITION OF OXYGEN TO METHYL ESTERS Ber. 75B, 203-10 (1942); C. A. 37, 3051-3 (1943).

"In this and the following papers of this series, by oxygen-active acids are designated such multiply-unsaturated acids as, because of the special arrangement of their double bonds, show strong affinity for mol. O even at room temp. and in the absence of catalysts. Their theoretically most interesting and practically most important representatives are, in addn. to the low-mol. sorbic acid, the higher-mol. eleostearic (I), linoleic (II), linolenic (III) and the highly unsatd. acid (IV) of cod-liver oil which was formerly believed to be identical with the pentaenoic clupadonic acid of sardine and other marine animal oils but which has 6 double bonds and, for lack of a special name, is designated α - or β -cod-liver oil hexaenoic acid. With respect to their reactivity, these acids fall into two classes: the 2 and 3 double bonds of sorbic acid and I are in the 1,3 position to each other (conjugated), whereas in II, III and IV the double bonds are in the 1,4-position to each other, i.e., with a CH_2 group between them.**the course of the oxidation of the Me esters of I-IV has been studied. I was prepd. from wood oil by sapon. and purified by crystn.***To obtain comparable O absorption relationships and curves, gravimetric autoxidation expts. were run on about 0.001 g.-mol. of each ester on 9 x 12 plates in indirect daylight. The increases in wt. (in mg. and atoms O per mol. ester) were plotted against time.***the curve for I corresponded more or less to the Morrell formulation (C. A. 30, 8654) of autoxidation; after 2 atoms of O had been added very rapidly there was a further increase in wt. which, however, was exceedingly slow and stopped almost completely before an addnl. atom had been absorbed.***only by comparison of the gain wt. with the vol. of O absorbed was it possible to det. the additive part of the reaction, the beginning of the elimination of water, and the greater or lesser volatility of any decompn. products formed. The expts. for this purpose were

carried out in 50-cc. glass cylinders sealed at 1 end and provided with a glass stopcock at the other end. To increase the surface the ester (about 2 mols.) was distributed on purified glass wool or qual. filter paper. The tube, contg. the ester on the glass wool or paper, was evacuated, filled with O and connected through a short CaCl_2 tube with a nitrometer filled with O. All the expts. were carried out at 20°. After a vol. of O corresponding to about 0.5 atom had been absorbed, the tube was weighed, evacuated, refilled with O and weighed again. The process was repeated until a loss in wt. between weighings showed that easily volatile or gaseous compds. had been formed; the evacuated tube was again filled with O and the absorption of O followed as before. Each of the 2 supporters (glass wool and filter paper) of the esters had its advantages and disadvantages. Glass wool took no measureable part in the autoxidation process but the distribution of the ester on it was always irregular. Since liquid films sep. the successive partial reactions of the autoxidation process the more sharply the thinner they are, non-uniform distribution of the liquid results in irregular and blurred curves owing to superimposition of the partial reactions on each other. Filter paper effects a very uniform distribution of the ester and gives regular and reproducible curves but it takes an active part in the autoxidation process. It has, especially at the beginning, a distinct delaying action on the absorption velocity and at the same time catalytically accelerated the elimination of water in the region of max. absorption. Moreover, in the 1st stages it is itself attacked by O, with liberation of CO_2 . To prevent this, the paper must previously be exposed a long time to O and then subjected to a high vacuum. The wt. increases and the vols. of O absorbed were plotted as ordinates against time as abscissas. The ester of I gave entirely different curves with glass wool and with filter paper. On glass wool it absorbed 2 atoms of O very rapidly; further absorption was exceedingly slow and no elimination of water began after addn. of 1.5 atoms of O and proceeded at such a rate that the gravimetric curve became parallel to the abscissa.*** Whereas the peroxidized esters of II and III are viscous liquids and that of I is gel-like, those of the IV are solid elastic films." From C. A.

Treibs, Wilhelm

AUTOXIDATION OF OXYGEN-ACTIVE ACIDS. II. VISCOMETRIC ANALYSIS OF THE ADDITION OF OXYGEN TO METHYL ESTERS.

Ber. 75B, 331-5 (1942); C. A. 37, 3053 (1943).

"As the basis for the viscometric study of the autoxidation process the η of the following Me esters were detd. at 14° ($H_2O = 1$): linolenic acid 5.0, linoleic acid 6.9, oleic acid 10.2, ricinoleic acid 13.5, isocleostearic acid 15.8 and the α -isomer 20.3; glyceryl di linolenate linoleate 105; glyceryl trioleostearate 367. These values show a diminution with increasing no. of isolated and an increase with increasing no. of conjugated double bonds. The course of the autoxidation of the esters is viscometrically analyzed by observing the rate of rise of the ester in a narrow strip of filter paper. Me α -oleostearate is shown to be converted immediately by O into a polymeric monoperoxide, whereas Me linolenate and linoleate give monomeric monoperoxides; polymerization and less of H_2O accompany further addn. of O." From C. A.

Treibs, Wilhelm

AUTOXIDATION OF OXYGEN-ACTIVE ACIDS. IV. REFRACTOMETRIC ANALYSIS OF ADDITION OF OXYGEN TO METHYL ESTERS.

Ber. 75B, 925-33 (1942); C. A. 37, 3400-1 (1943).

"Refractometric analysis of the autoxidation phenomena, like volumetric, gravimetric and viscometric methods, shows that there is a fundamental difference between the action of mol. O on Me oleostearate (I) and Me esters of linoleic (II), linolenic (III) and hexanoic acids (IV). After the monoperoxide stage is reached with I, there is a marked satn. of the double linkage, whereas with II-IV the degree of satn. is scarcely or not lessened, as detd. by refractometric studies.**Curves show a relation between the no. of O atoms taken up, n and d ." From C. A.

Treibs, Wilhelm

AUTOXIDATION OF OXYGEN-ACTIVE ACIDS. IX. REACTION OF PEROXIDES WITH LEAD TETRAACETATE AND WITH HYDROXYLAMINE.

Ber. 77B, 69-71 (1944)*; C. A. 39, 2735 (1945).

"The question whether in the autoxidation of O-active acids or their esters hydroperoxides or ethylene active acids are formed has not yet been definitely settled. A refractometric study of Me linolate (I), linolenate (II), and codliver oil hexaenate (III) led Täufel (C.A. 39, 2211) to again suggest that the formation of hydroperoxides as formulated by Rieche, which is also supported by Farmer and Sutton (C. A. 37, 4352). The weak point in such refractometric measurements is the detn. of the d . of the minute amts. of exceedingly viscous products formed by treating thin liquid films with O; as will be shown later, treatment in larger amts. with O in a shaking machine or by bubbling O through them leads to materially different results and products than does

their autoxidation in thin films. Addnl. data for deciding the question at issue are afforded by the action of $\text{Pb}(\text{OAc})_4$, which, according to Criogee, Pilz and Flygare (C. A. 33, 9292) converts hydroperoxides into the ketones with evolution of volumetrically measureable amts. of O (1 atom per mol. hydroperoxide) while it does not react with peroxides which do not have the grouping-O.OH. The different esters (1 millimol.) were subjected in the usual way to autoxidation to varying degrees and then treated with excess of $\text{Pb}(\text{OAc})_4$ in glacial AcOH in a tube with side arm (such as is used in Zeisel detns.) connected to a Lunge nitrometer. II which had not absorbed more than 1.5 atoms O per mol. evolved no O, but after it had absorbed 2 and 3 atoms, it evolved 0.1 and 0.18 mol. O, resp. I, III, and Me cloostearato (IV) behaved in the same way. It may therefore be definitely stated that the action of O on the esters of O-active acids does not take place at a reactive CH_2 group with formation of peroxides but, rather, that ethylene peroxides are formed; hydroperoxides seem to appear only at later stages of the autoxidation. With free 0.1 NH_2OH in MeOH the characteristic difference between the monoperoxides of esters of cloostearic acid and those of the 3 other acids again appeared. Reaction with the autoxidized esters was complete in 15-18 hrs. at room temp. and the back titrations with 0.1 N H_2SO_4 and methyl orange or bromophenol blue were made after 24 hrs. The results are plotted in terms of atoms O absorbed against equivs. NH_2OH consumed per mol ester. IV reacted only at the monoperoxide and higher stages, not at the peroxane stage; on the other hand, the NH_2OH consumption curves of I, II, and III rose entirely similarly and in a straight line to about 2.5 equivs. at the monoperoxide stage. The curve for I then fell steadily while with II up to about 3 atoms absorption there was no further consumption of NH_2OH ; only in the last part of the reaction did the curve rise again. The autoxidation of II is therefore distinctly divided into 3 parts; the same is true of III. The total consumption of NH_2OH is a complex magnitude resulting from satn., oxime formation, and oxidation to N. Liberation of N is already detectable, with I, II, and III, at the very first part of the autoxidation, both from NH_2OH and from N_2H_4 , but only half as much N is set free in the latter case: $2 \text{NH}_2\text{OH} + \text{O} = 2 \text{N} + 2 \text{H}_2\text{O}$, and $\text{N}_2\text{H}_4 + 2 \text{O} = 2 \text{N} + 2 \text{H}_2\text{O}$. At the very beginning then of the autoxidation of I, II, and III, but not of IV, there is formed a strongly oxidizing primary peroxide which accumulates up to about 0.4 mol. and then rearranges into the more stable ethylene peroxide." From C. A.

Tsao, Y. Y.

TUNG SEED AND OIL OF ANHWEI PROVINCE.

Scienco (China) 5 (8), ?? (1920) (in Chinese)*.

Tupholme, C. H. S.

DERMATITIS FROM TUNG OIL.

Brit. J. Dermatol. Syphil. 51, 138-40 (1939).

A laboratory worker exposed to vapors from heated tung oil of Chinese origin developed eruptions and vesicles over his entire body. It was suggested that the tung oil might have been adulterated with Chinese lacquer oil (Rhus vernicifera).

Ubbelohde, L., and Svane, Th.

HYDROGENATION OF OILS USING NICKEL AS CATALYZER.

Z. angew. Chem. 32, I, 257-62, 269-72, 276-80 (1919)*; Chem. Zentr. 1919, IV, 683; C. A. 14, 644 (1920).

A study of the hydrogenation of cottonseed, fish, castor, and tung oils.

U. S. Bur. of Agricultural Economics.

THE JOBS OF THE PECAN, TUNG-NUT, WALNUT, AND SIMILAR FARMERS.
WHAT THEY DO, WHAT THEY NEED TO START A FARM, WHAT ARE THEIR
CHANCES OF MAKING A LIVING.

Natl. Roster Sci. and Specialized Personnel. Occup. Brief 62, 12 pp. (July 1, 1947).

Utz, [F.]

EXAMINATION OF CHINA WOOD OIL.

Farben-Ztg. 18, 2531-3 (1913); C. A. 7, 4082 (1913).

"Largely a review. China wood oil may be adulterated with gurjun balsam (which has n_D 1.513-4) and yet exhibit normally high refraction. This type of adulteration may be readily detected by a detn. of the optical rotation of the mixt. (α_D of gurjun balsam is -48° to -61° , wood oil has α_D $+0$) or by abnormally low sapon. no. (gurjun balsam having sapon. no. of 17 to 30). Many of the qual. tests for the presence of balsam are given, including U.'s original test in which 5 drops of the oil mixt. are dissolved in 5 cc. AcOH and 2 cc. of SnCl_2 are added, in the cold. In the presence of 5% (or more) of gurjun balsam, the soln. assumes a color varying from salmon to a deep blood-red or purple, depending on the conc. of the adulterant. If no red coloration is produced in the cold, the test may be modified to show the presence of sesame oil (sometimes used as adulterant in China wood oil) which in small quantities gives a similar test in boiling soln." From C. A.

Utz, [F.]

THE EFFECT OF NITRIC ACID ON SOME OILS.

Chem. Rev. Fett.- u. Harz-Ind. 12, 49 (1905)*; Chem. Zentr. 1906, I, 96.

Chinese wood oil was unchanged by treatment with nitric acid.

Van Heuckeroth, A. W., Hill, R. W., and Cook, G. S.

PROTECTIVE COATINGS FOR UNDERWATER STEEL STRUCTURES.

New York Univ. Coll. Eng. Symposium on Varnish and Paint Chem.
1948, 41-50*; C. A. 44, 5610. (1950).

Vila, A.

WORK OF THE "OFFICE NATIONAL DES RECHERCHES ET DES INVENTIONS" ON
CHINA WOOD OILS FROM THE FRENCH COLONIES.

Agron. colonialo 23 (198), 161-167 (1934).

von Mikusch, J. D., and Frazier, Charles

WOBURN IODINE ABSORPTION METHOD. MEASURE OF TOTAL UNSATURATION
IN THE PRESENCE OF CONJUGATED DOUBLE BONDS.

Ind. Eng. Chem., Anal. Ed. 13, 782-9 (1941); C. A. 36, 288 (1942).

"The I reagents in use react incompletely with substances contg. conjugated double bonds. The methods recommended for detn. of the total unsatn. of conjugated oils and fat acids are complicated and are not generally used. Hanus soln. in large excess measures the total unsatn. of dehydrated castor oil, but the method is unsuitable for other conjugated oils and fat acids. By using IBr solns. of up to twice the concn. of the Hanus method, a simple procedure is evolved for conjugated and nonconjugated substances. Fat acids with conjugated double bonds, made by an isomerization process from natural fat acids, give low I nos. with the standard methods. With the proposed method the I nos. are identical with those of the nonconjugated fat acids from which they were made. With dehydrated castor oil const. values result over a wide range of excess of reagent. With tung oil, a reproducible value of about 225 is obtained if temp., excess and time of contact are kept within certain limits. The effect of changes in working conditions on the value for the total unsatn. of tung oil somewhat resembles the effect of similar changes in detn. of the Wijs I no. of the oil. Theoretical values are obtained with β -oleostearic acid, 9,11-linoleic acid, and blends of the latter with nonconjugated fat acids, if proper conditions are used. Values for oiticica oil and for nonconjugated oils and acids are listed." From C. A.

Wagner, Hans

THE ACTION OF PIGMENTS ON CHINA WOOD OIL.

Paint Varnish Production Mgr. 14, 16-7, 23, 38 (July, 1930).

"It has been shown that crude China wood oil when ground with pigments, in the course of time (when kept in tubes), undergoes a definite change in consistency. The hardening of such mixtures is to be attributed to the separation of the glyceride of oleostearic acid.

There are also various differences in the changes which follow the fresh grinding of pigments with crude China wood oil, differences in the quantitative separation of the glyceride and also in the crystal form.

The separation of the glyceride is influenced within comparatively narrow limits by: Iron oxide pigments, Terra di Siena, ochreic hydroxide green, cadmium orange, many ultramarines, barites, gypsum, kaolin, and chalk. Here the chief factor is probably a mechanical influence upon the crystallization.

The separation of the glyceride is markedly effected, (a), in a positive direction, by many ultramarines, zinc sulfide, and lithopone; (b), in a negative direction, by zinc white and calcium carbonate. Here we are dealing with catalysis of the inversion of the glyceride.

A connection between these phenomena and polymerization and drying is possible, though not as yet proved." Summary of the article.

Waldie, W. A.

THE SCIENCE OF WRINKLE FINISHING.

Research Press, Inc., Dayton, O., 204 pp. 1949.

The formulation, manufacture, application and characteristics of "wrinkle" finishes are discussed in considerable detail. One chapter is devoted to tung oil formulations. An appendix reviews the chemistry of the drying of oils and contains a bibliography of references to 117 articles and 93 patents.

Walker, J., and Warburton, G.

HEXABROMIDES OF GLYCERIDES AND FATTY ACIDS.

Analyst 27, 237-8 (1902); J. Soc. Chem. Ind. 21, 1144 (1902).

Only traces of hexabromides were obtained from Chinese wood oil by the method of Hehner and Mitchell.

Wallis, Earl

RELATIONS BETWEEN TUNG PRODUCER AND MILLER.

Proc. Am. Tung Oil Assoc. 1942, 34-5.

Of the 20 percent of oil present in tung fruit only 17 percent is recovered by the mills because of dirt and moisture in the fruit and because of losses of oil in hulling and in the press cake.

Wampler, R. H.

DRYING BEHAVIOR OF VARNISHES ON WOOD. II.

Ind. Finishing (Indianapolis) 25 (7), 74, 76, 78, 82, 84; (8), 76-8, 80, 84, 86 (1949); C. A. 43, 6836-7 (1949).

This article "deals with the drying of different varnish finishes and with what accelerates and what slows up the drying of the varnish coat." From C. A.

Hard-drying oils such as tung oil contribute to fast drying.

Wan, C. S.

TUNG OIL PRODUCTION IN THE BRITISH EMPIRE.

Chinese Ind. 1, 529-33 (1935) (in Chinese)*.

Wang, C. L.

TUNG TREE PLANTATION IN FOREIGN COUNTRIES.
Chinese Ind. 1, 101-14 (1935)*.

Wang, C. T.

THE CHINESE DRYING OILS. I.

J. Chinese Soc. Chem. Ind. 1, 11-30 (1923)*; C. A. 17, 2512 (1923).

"Tung oil and perilla oil are the important drying oils of China. Perilla was used in China in ancient times, but had been largely superceded by tung oil. The drying qualities of perilla oil are superior and this industry should be revived in China."
From C. A.

Wang, T. Y.

ELEOSTEARIC ACID.

Nat. Shangtung Univ. Chem. Lab. Repts. 1934 (3/4), 9-18 (in Chinese)*.

Ward, F. K.

A HYBRID ALEUKITES.

Gard. Chron. 122, 128-9 (Oct. 11, 1947)*; Bibliog. of Agr. 12, No. 1338 (1948).

A. montana x A. fordii at the Tea Research Station, Assam.

Ware, E. E., and Schumann, C. L.

TESTING OF CHINESE WOOD OIL.

J. Ind. Eng. Chem. 6, 806-9 (1914); Chem. Zentr. 1915, I, 919.

See "Examination of Chinese Wood Oil" by the same authors (Drugs, Oils & Paints 30, 52-4 (1914)).

Waterman, H. I.

SELECTIVE HYDROGENATION.

Chimie & Industrie 61, 125-35 (1949); C. A. 43, 6841 (1949).

"A description is given of the results obtained in the hydrogenation of a no. of fatty oils and naphthalene.***"
From C. A.

High temperatures and low hydrogen pressures favor selective hydrogenation of tung oil to glycerides of dienoic acids. The reaction was followed by means of measurements of refractive index, optical dispersion and hydrogen-iodine number.

Watson, J. A.

AN INVESTIGATION OF THE TOXICITY OF TUNG MEAL.

Ph.D. Diss. Louisiana State Univ., 1947

In addition to his own experimental work, W. has included a very extensive review and bibliography covering past work on the toxicity of tung products.

Watts, E. B.

HE STARTED IT ALL.

Tung World 4 (4), 6-7, 16 (1949).

"An interview with Dr. David Fairchild, who planted the first tung nuts in the United States and watched them grow into a leading Southern Industry." Subtitle.

Webster, C. C.

A SIMPLE METHOD OF BUDDING TUNG TREES.

Nyasaland Agr. Quart. J. 1 (1), 8-12 (1941)*; Biol. Abs. 16, 483 Abs. No. 5337 (1942).

"A method found to be easy and successful in Nyasaland is described for patch budding of seedling stocks of tung trees (Aleurites fordii and A. montana). The maintenance of a multiplication nursery is recommended, owing to the difficulty of obtaining sufficient quantity of good budwood from high-yielding trees over 6-8 yrs. old." From Biol. Abstracts.

Webster, C. C.

A NOTE ON THE POSSIBLE PRODUCTION OF HYBRID SEED BY NATURAL CROSS POLLINATION BETWEEN ALEURITES FORDII AND A. MONTANA.

Nyasaland Agr. Quart. J. 1 (2), 14-5 (1941)*; Biol. Abs. 16, 229, Abs. No. 2656 (1942).

"Plants intermediate in appearance between A. fordii and A. montana have been observed in nurseries and fields established from seed which came from mixed plantations of the 2 spp. These are probably hybrids arising from natural cross pollinations." From Biol. Abs.

Webster, C. C.

OBSERVATIONS AND EXPERIMENTS ON FLOWERING AND POLLINATION OF THE TUNG TREE.

E. African Agr. J. 9, 136-43 (1944)*; Bibliog. of Agr. 5, No. 1405 (1944).

Webster, C. C.

NOTES ON SOME CLONES OF BUDDED TUNG. (ALEURITES MONTANA).

Nyasaland Agr. Quart. J. 6, 73-9 (Oct., 1946)*; Bibliog. of Agr. 12, No. 7848 (1948).

Webster, C. C.

IS "L'ILE MAURICE" SUITABLE FOR THE CULTURE OF TUNG?

Rev. Agr. ile Maurice 26, 298-9 (Nov./Dec., 1947)*; Bibliog. of Agr. 12, No. 50,693 (1948).

Webster, C. C.

A NOTE ON THE CULTIVATION AND MANURING OF TUNG PLANTATIONS
(ALEURITES MONTANA).

Nyasaland Agr. Quart. J. 7, 58-64, (1948)*; Soils and Fertilizers
12 (1), 51 (1949) (abstract)*; Oléagineux 4 (7), 464 (1949).

"Care in the maintenance of tung is important during the first 3 years of its development. The harvests obtained when soybeans are used as cover crops are greater than with cover crops of maize, beans, and Calopogonium. The trees respond to the application of 4 lb. of $(\text{NH}_4)_2\text{SO}_4$ and to manure, but not to P, or to K. The application of 5 kg. per tree of tung press cake improves the yield." Translated from Oléagineux.

Webster, C. C.

THE EFFECT OF SEED TREATMENTS, NURSERY TECHNIQUE AND STORAGE
METHODS OF THE GERMINATION OF TUNG SEED.

E. African Agr. J. 14 (1), 38-48 (1949); Biol. Abstracts 23, 1316.
Abs. No. 12,606 (1948).

"Seasonal climatic conditions in relation to tung nursery work in Nyasaland are described and an account is given of experiments which aimed at reducing the time required to produce plants big enough to bud, and at minimizing watering costs, by accelerating the rate of germination of seeds and by eliminating the loss of viability which normally occurs during storage of seeds." From summary of the article.

Webster, C. C.

THE TUNG EXPERIMENTAL STATION NYASALAND

Nyasaland Agr. Quart. J. 8, 1-15 (1949); Hort. Abstracts., 19
(3), 307-8, Abs. No. 2449 (1949); Oléagineux 5 (8/9), 551 (1950).

"Publication of work carried out at that station concerning the selection and culture of Aleurites montana". Translated from Oléagineux.

Webster, C. C., and Wiehe, P. O.

DIE BACK OF TUNG TREES IN NYASALAND.

Nyasaland. Dept. Agr. Plant Disease Circ. 1 (1950)*.

Reviewed in Am. Tung News 2 (1), 12-14 (1951).

Weger, M.

THE OXYGEN ABSORPTION OF DRYING OILS

Z. angew. Chem. 1898, 491, 614.

Wood oil was spread on plates (.0007-.0014 mg/cm²) to dry and the latter weighed at intervals. It gained 21.7% in wt. in 14 days. A wood oil varnish composed of wood oil (100), linseed oil (8), Pb-Mn Resinate (4) gained 14.2% in 14 days.

Weger, M.

THE OXYGEN ABSORPTION OF DRYING OILS

Jahrsbericht Uber Die Leistungen Der Chemischen Technologie 44, 1160-3 (1898).

In 14 days 21.7% of oxygen was taken up by wood oil.

Wen, S. H.

A PROPOSAL OF ESTABLISHING A TUNG OIL REFINERY IN CHEKIANG PROVINCE.

Ind. Research (China) 5, 51-3 (1936) (in Chinese)*.

Wessel, C. J.

A STUDY OF THE ESTERASE ACTIVITY OF ALEURITES FORDII.

Contr. Biol. Lab. Catholic Univ. Am. 38, 1-72 (1941); Biol. Abstracts 17, 1085, Abs. No. 12,256 (1943).

The esterase activity of defatted tung nuts was investigated using a continuous titration method (glass electrode).

Whitlow, S.

TUNG TREES FOR TEXAS.

Prog. Farmer, Tex. Ed. 62 (7), 11 (July, 1947)*; Bibliog. of Agr. 11, No. 17,825 (1947).

Whitlow, S.

TALK ABOUT TUNG TREES.

Prog. Farmer Tex. Ed. 63 (2), 112 (Feb., 1948)*; Bibliog. of Agr. 12, No. 24,114 (1948).

Wiernik, M.

DETERMINATION OF IODINE VALUE BY THE HANUS METHOD.

Farben-Ztg. 33, 1973 (1928).

The Hanus and the Hubl-Waller methods are compared on wood oil and on linseed oil. On the wood oil they gave iodine values of 205 and 130, respectively.

Wilborn, F.

THE EFFECT OF DRIERS ON WOOD OIL STAND OIL.

Chem. Tech. 2, 123-5 (Apr., 1950)*; U. A. 44, 8132 (1950).

Williams, Rowland

JAPANESE WOOD OIL.

J. Soc. Chem. Ind. 17, 304-5 (1898).

"Although wood oil ("tung oil") ----- can hardly be regarded as a commercial article --- it has been imported to a certain extent during the last year or so." Constants were determined on 12 samples of oils received at different times and from different shipments, some of them large. The ranges for the values obtained were: $d_{15.5}^{20}$ 0.9413-0.9432; KOH absorption (%), 19.07-19.61; free fatty acids, as oleic (%), 2.70-5.30; Bromine thermal value (Hehner), 26.7-27.6; iodine absorption (Hubl),

155.37-165.7; bromine absorption (gravimetric), 93.14-104.3; oxygen absorption (gravimetric), 4.24-7.17; unsaponifiable matter, 0.44-0.69; insoluble fatty acids, 97.3, 96.66; m. p. of acids, 40.0, 49.4°; solidifying point of acids, 37.1, 37.2°." From J. Soc. Chem. Ind.

Wood, S. C.

WOOD OIL SITUATION IN CHINA.

Paint Varnish Production Mgr. 26, 179-81, 183-4 (July, 1946)*; Bibliog. of Agr. 9, No. 22,703 (1948); Paint, Oil Chem. Rev. 109 (11), 18-20 (1946).

Woolley, F.

TUNG (ALEURITES FORDII) AND UTILIZATION OF ITS OIL.

Rev. de Agr. (Piracicaba) 19, 153-4 (Mar./Apr., 1944); Bibliog. of Agr. 5, No. 19,572 (1944).

Woolley, F.

TUNG OIL (ALEURITES FORDII).

Rev. de Agr. (Piracicaba) 17, 279-80 (July/Aug., 1943)*; Bibliog. of Agr. 4, No. 958 (1944).

Woolley, F.

TUNG (ALEURITES FORDII).

Rev. de Agr. (Piracicaba) 20, 132-9 (Mar./Apr., 1945)*; Bibliog. of Agr. 7, No. 21,681 (1945).

Wornum, W. E.

THE GELATION OF TUNG OIL.

J. Oil & Colour Chemists' Assoc. 17, 219-24 (1934).

The fact that time of gelation-temperature curves for tung oil are hyperbolic in shape lacks mathematical significance because different portions of the curve represent different phenomena.

Wu, C. C.

A STUDY OF THE CHEMICAL COMPOSITION OF CHINESE WOOD OIL.

Unpublished thesis, Stanford, 1926.

Wu, Chin-Chuan

THE FORMATION OF β -ELEOSTEARIN IN CHINESE WOOD OIL UNDER THE INFLUENCE OF LIGHT.

Ph.D. thesis, Stanford Univ., 1927-28*.

Wu, C. C.

ACTION OF SUNLIGHT ON TUNG OIL.

Nat. Univ. Chekiang, Hangchow, China, J. Chem. Eng. 1 (1), 37-43 (Apr., 1933) (in Chinese)*.

Wu, H. S.

TUNG OIL.

Chiao-Tung Univ. Research Inst. Rept. on Paint and Varnish Testing (6), No. 1, 21-50 (1934) (in Chinese)*.

Yin, H. C., and Liu, C. H.

EXPERIMENTS ON THE ROOTING OF TUNG TREE CUTTINGS.

Am. J. Botany 35, 540-2 (1948)*; Hort. Abstracts 19 (1), Abs. No. 559 (1949); Oléagineux 4, 643 (1949).

A study of the effect of growth substances on the rooting of tung tree cuttings. Indole acetic acid was of value but naphthalene acetic acid was not recommended. Listed without abstract on p. 49.

Yuan, S.

CHINESE CULTIVATED PLANTS.

Pub. by Commercial Press, Shanghai, China, 1937 (in Chinese)*.

Reported to contain information on the tung tree.

Yuyee, K. S.

REPORT ON TUNG OIL INDUSTRY IN CHEKIANG PROVINCE.

Pub. by the Gov. Testing Bur. Shanghai, China, 119 pp., (1934) (in Chinese)*.

(b) Patents

Alvarado, A. M. (to DuPont de Nemours, E. I., & Co.)

TREATMENT OF OILS OF THE TYPE OF CHINA-WOOD OIL AND OITICICA OIL.
U. S. 2,112,354 (Mar. 29, 1938); C.A. 32, 3992 (1938).

"An oil such as China-wood oil is heated in contact with air to about 120-260° until its viscosity is between 3 and 150 poises, a solvent such as "mineral spirits" is added and the oil is aged in contact with air." From C.A.

Arvin, J. A., and Gitchel, W. B. (to Sherwin-Williams Co.)

STYRENE-OIL SOLUBLE NATURAL RESIN-DRYING OIL INTERPOLYMER.

U. S. 2,457,768 (Dec. 28, 1948); C.A. 43, 2448 (1949).

"Rosin and styrene in ratio of 1:1 to 9:1 with 5-35% by wt. of a drying oil [which may be tung oil] are polymerized at 300-350° F. The resultant interpolymers which have acid values of 45-135 are partially esterified to acid numbers below 25 with a polyhydric alcoholized drying oil contg. at least one free hydroxyl group, and dissolved in a nonaromatic solvent to produce a clear varnish." From C.A.

Barkhuff, R. A., Jr. (to Monsanto Chemical Co.)

COATING COMPOSITIONS.

U. S. 2,538,857 (Jan. 23, 1951); J. Am. Oil Chemists' Soc. 28, 175 (1951).

"A mixture of thiophene (84), formalin (105), 2-ethyl hexanol (1) and sulfuric acid (4) was reacted at 100-105° and 20-25 p.s.i. for three hours. The product was cooled and neutralized with lime (5) and dehydrated under vacuum. The resulting syrup can be used to modify heat-reactive oils. For example, the syrup prepared as described (1) plus tung oil (1) and bodied linseed oil (1) was heated to 265-271° for one and one-half hours. This gave a modified oil which dried to a hard smooth film in 15 minutes at 150° with drier." From J. Am. Oil Chemists' Soc.

Beynon, N. T.

WRINKLE-COATING COMPOSITION CONSISTING OF A MIXTURE OF CONJUGATED DOUBLE-BONDED OIL AND AN AQUEOUS EMULSION OF POLYVINYL ACETATE RESIN.

U. S. 2,479,298 (Aug. 16, 1949); C.A. 43, 9485 (1949).

"Wrinkle-drying surface coating made from an uncooked homogeneous mixt. of double-bonded oil 100 and an oil-sol. polyvinyl acetate resin, from 10 to 50 parts by wt., in the form of an aq. emulsion, to which is added 40-80 parts by wt. of a color-pigment paste contg. pigment 2, to conjugated double-bonded oil 1 part by wt., with sufficient volatile spirits to adjust. This coating may be dried at 130-180° F. to form different-textured wrinkle surfaces on paper, wood, metal, or fabric. The texture may be varied with changes in ratios of oil to resin." From C.A.

As suitable conjugated double-bonded oils there are listed the following: tung oil, oiticica oil, dehydrated castor oil, and alkali-isomerized peanut or cottonseed oils.

Blakeman, W. N.

PAINT COMPOSITION

U.S. 1,375,355 (Apr. 19, 1921)

This patent relates to the use of a paint vehicle comprising a marine animal oil and tung oil (in their untreated commercial condition) and an anhydrous pigment.

Bloch, H. S., and Hoffman, A. E. (to Universal Oil Products Co.)

COBODIED DRYING OILS

U. S. 2,523,609 (Sept. 26, 1950).

A synthetic oil, prepared from petroleum hydrocarbons and possessing the properties of a drying oil, is combined with and bodied with a natural drying oil such as linseed oil, tung oil, soybean oil, etc., to give a product of improved utility in paints, coating compositions, and varnishes.

Bobalok, E. G. (to Arco Co.)

INTERPOLYMER PRODUCED FROM POLYHYDRIC ALCOHOL, POLYBASIC ACID AND INTERPOLYMER OF MONOVINYLAROMATIC COMPOUND, OLEFINIC ACID, AND DRYING OIL OR FATTY ACID.

U. S. 2,470,752 (May 24, 1949); C.A. 43, 6433 (1949).

The iodine number of the drying oil used should be "at least as great as that for dehydrated castor oil * * * but no greater than that of beta-eleostearic acid (approximately 274 Woburn)." From the patent.

Bobalok, E. G. (to Arco Co.)

INTERPOLYMERS OF MONOVINYL AROMATIC COMPOUND, MONOCARBOXYLIC OLEFINIC ACID, AND DRYING OIL OR ACID.

U. S. 2,470,757 (May 24, 1949); C.A. 43, 5972 (1949).

"The reactants are first polymerized together to a point short of gelation and the product is then treated with a polyhydric alc. to esterify free carboxyl groups. Styrene, *o*-Me styrene, and fluorostyrene are best suited as the monovinyl aromatic compd., while crotonic, methacrylic, acrylic, and cinnamic acids are used as the monocarboxylic olefinic acid. The drying-oil constituent must be partially conjugated and may be used as the oil, oil fatty acids or synthetic esters of the fatty acids. In a typical prepn. dehydrated castor oil (Gardner-Holdt viscosity U-V) 280, cinnamic acid 37, styrene 250, and BzO₂ 6 g. are heated at 130-50° for 1 hr. in a 3-necked 1-l. flask fitted with reflux condenser, thermometer, and stirrer. The product gives cloudy solns. with common solvents and exhibits poor film-forming properties. To this interpolymer are added glycerol 30 and Ca stearate 3 g. The reflux condenser is removed and CO₂ is passed through the mixt. while the temp. is raised to 220-40° and maintained until the acid no. is less than 25 and the resin (cooled on glass) is clear and gummy. The reaction is checked short of gelation by diln. to 60% solids with a petroleum hydrocarbon solvent b. 150-200°. Films made from the resin, after a 0.5 hr. bake at 250° F. show excellent toughness, adhesion, and gloss. It is particularly useful in air-drying or baking enamels, giving superior baking or weathering conditions." From C.A.

The drying oil "should have an iodine number no greater than that of beta-eleostearic acid (approximately 274 Woburn)." From the patent.

Bradley, J. J. (to Boston Varnish Co.)

OLEORESINOUS VARNISHES AND METHODS FOR PREPARING THEM.

U. S. 2,550,961 (May 1, 1951).

Claim No. 1 of the patent applies to "The process for the production of an oleoresinous varnish of improved color and drying characteristics which comprises forming a solution or dispersion in a hydrocarbon solvent of an oil-soluble varnish resin and an unsaturated glyceride drying oil, the weight of the solvent being from 30% to 2400% of the weight of the resin, and the oil present containing on the average more than 5.5 double bonds per molecule of oil, of which at least 15% are in conjugated position, and a coordination complex of boron trifluoride and an organic compound selected from the class consisting of ethers, alcohols, acids and ketones equivalent to 0.25% to 4.0% by weight of boron trifluoride based on the varnish non-volatile content, maintaining said mixture at a temperature in the range 60° F. to 100° F. for less than 4 hours and until the viscosity reaches a varnish consistency, adding a basic substance to the resulting varnish in an amount sufficient to react with substantially all of the boron trifluoride-organic compound coordination complex present in the mixture, and removing the reaction product from the varnish."

Oils desired for this purpose include China-wood oil, oiticica oil, isomerized linseed oil and dehydrated castor oil.

Bragdon, C. R. (to Interchemical Corp.)

DRYING OF PRINTING INK.

Can. 394,687 (Feb. 18, 1941); C.A. 35, 3111 (1941).

"A printing ink consists of a coloring material dispersed in a petroleum-hydrocarbon soln. of an alc.-insol. binder. The wet film is treated with a water-miscible lower aliphatic alc., in amt. more than necessary to dissolve the petroleum hydrocarbon and ppt. the binder, and a portion of the alc. contg. the dissolved hydrocarbon is removed. One of several examples of suitable ink is molybdated chrome orange 60, varnish 40, polymerized olefin hydrocarbon resin 48, China wood oil 12, and petroleum distillate 40 parts." From C.A.

Brown, A. L. (to Westinghouse Electric & Manufacturing Co.)

FLUID CONDENSATION PRODUCT.

U. S. 1,820,690 (Aug. 25, 1931); C.A. 25, 5740 (1931).

"A liquid product capable of being hardened by heating is obtained by the reaction of a drying oil such as China wood oil, phenolic material such as cresol and CH₂O or other equiv. CH₂-contg. reactive material, in the presence of a drier (such as 2.5% of Pb and Mn resinates and tungstates) which catalyzes the reaction, and removing water by vacuum distn. at 50-80°." From C.A.

Bruson, H. A., and Niederhauser, W. D. (to Resinous Products & Chemical Co.)
ADDITION PRODUCTS OF ACRYLONITRILE AND DRYING OIL ACIDS AND ESTERS
U. S. 2,440,140 (Apr. 20, 1948); C.A. 42, 6376 (1948).

"Cyano carboxylic acids or esters of definite compn. can be obtained by the reaction at 80-300° of equimol. amts. of an acrylonitrile and a long-chain fatty acid (or its ester) in which there are 2 olefinic linkages in conjugate arrangement. The addn. is effected in the absence of a catalyst and preferably in the presence of an inhibitor and under an inert atmosphere. * * * The addn. products are useful as plasticizers and intermediates for the prepn. of dicarboxylic acids and derivs. which are used in the manuf. of plastics. Cf. C.A. 42, 3778." From C. A.

Among the unsaturated materials which may be copolymerized with acrylonitrile are: tung oil, tung oil acids, α -oleostearic acid, β -oleostearic acid, β -licanic acid, methyl octadecadienoate, etc.

Bruson, H. A., and Niederhauser, W. D. (to Rohm & Haas Co.)
ADDITION PRODUCTS FROM ACRYLIC ESTERS.

U. S. 2,452,029 (Oct. 26, 1948); C.A. 43, 2034 (1949).

"Addn. products of one mol. of acrylic ester per mol. of unsatd. fat acids are formed when heated under reflux. The resulting oils are useful as plasticizers and intermediates for the prepn. of dicarboxylic acids and resins therefrom, and amides. Typical unsatd. fat acids used are oleostearic, licanic, and 9,11-octadecadienoic acids as well as tech. mixt. of such acids resulting from tung oil. Cf. C.A. 42, 6376." From C.A.

Bruson, H. A., and Niederhauser, W. D. (to Rohm & Haas Co.)
HYDROXYCARBOXYLIC ACID.

U. S. 2,457,640 (Dec. 28, 1948); C.A. 43, 3039 (1949).

"HO carboxylic acids of the type $C_4H_9R(CH_2OH)(CH_2)_9CO_2H$, where R is a 6-sided carbocycle, are obtained by hydrogenating an aldehydic acid (I) in the presence of Raney Ni at 70-200° and pressures of 3-100 atm. A I is obtained by treating at 100-250° 1 mol. each of acrolein and α -oleostearic acid in the presence of a polymerization inhibitor, such as 2-naphthol or hydroquinone, in a N or CO₂ atm. Thus, I 17 titrated to a phenolphthalein end point with 3% KOH, mixed with Raney Ni 5 parts is heated with H in a rocking autoclave at 100° 3 hrs. at 100 atm. and at 180° 30 min. and then filtered and acidified, yielding a crude product, which after recrystn. from EtNO₂ m. 78.5-9°. When this product is heated it forms by autoesterification a linear polymer, $HO[CH_2C_6H_9Bu(CH_2)_9CO_2]_nH$, where n is the no. of HO units in the polymer. These polyesters are useful in lubricating oils and greases." From C.A.

Burg, A. R. van der

PROCESS FOR THE PRODUCTION OF A RUBBER SUBSTITUTE.
Austria 51,770 (Sept. 1, 1911).

A rubber substitute is made by heating a mixture of wood oil and rosin oil at 260° until a plastic mass is formed.

Chemische Fabriken, Dr. Joachim Wiernik & Co., A. G.

PROCESS FOR THE EXTENSION OF THE DRYING TIME OF OIL-CONTAINING COATINGS OR OILS AND VARNISHES.

Fr. 664, 249 (application Oct. 18, 1928); Chem. Zentr. 1929, II, 3190. Comparable to Brit. 299,024.

"Cirene-Werke" Joseph Lorenz & Co.

PROCESS FOR THE PRODUCTION OF WATER- AND ACID-RESISTANT PAINTS. Austria 121,984 (Nov. 15, 1930).

Describes paints containing waxes, wood oil or linseed oil, cobalt driers, and thinners.

Denes, Francois

PROCESS AND APPARATUS FOR CONTINUOUSLY HEATING CHINA-WOOD OIL.

Fr. 792,912 (Nov. 7, 1935); C.A. 30, 4344 (1936) (no abstract).

Eilerman, G. E. (to Pittsburgh Plate Glass Co.)

WATER DISPERSIBLE COATING VEHICLE.

U. S. 2,462,618 (Feb. 22, 1949); C.A. 43, 4493 (1949).

"Drying-oil paint vehicles, which are emulsifiable in water, and which form hard, water-resistant, durable films, can be made from hydrolyzed maleinized natural or synthetic drying oils or alkyd resin. Maleinized oil is the addition product of maleic anhydride and any oil. The drying oil is heated to 250° with 8-15% by wt. of maleic anhydride for 5 hrs., cooled to 130°, and water added; the continued heating at 130° for 1 hr. completes hydrolysis of the anhydride soln. product. By emulsifying these oils with Na silicate soln. and water-sol. basic N compd., stable coating compns. are formed." From C.A.

"China-wood oil, extracted linseed oil, high iodine soya bean oil, or any of the synthetic drying oils may be maleinized, hydrolyzed, and used * * * to prepare resin-emulsion paints." From the patent.

Gehronbeck, G. B. (to Minnesota Mining & Manufacturing Co.)

SOLUBLE AND INFUSIBLE SYNTHETIC RESINS AND METHOD OF PRODUCING THE SAME.

U. S. 2,456,629 (Dec. 21, 1948); C.A. 43, 2031 (1949).

"A sol. but infusible resin for coating or adhesives is made from tung oil, maleic anhydride, Cl₂, and glycerol in the following manner: tung oil 60 and maleic anhydride 20 lb. are heated to 70-80° until the reaction starts and carries the temp. to about 120°, and then are heated to 160° to complete the reaction. The mass is cooled to 80° and chlorinated with 10 lb. Cl₂ preferably in the presence of a catalyst, 36 g. I in 360 ml. EtOH. The temp. is maintained at 60-80° during chlorination. To 1 kg. of the chlorinated adduct is added 139.5 g. glycerol and the mass heated gradually to 160° SO₂ is bubbled through to prevent foaming and the esterification continued until the mass gels. A cement may be made from 3 parts of ester to 7 of acetone, which is suitable for joining leather to metal. * * *" From C.A.

Imperial Chemical Industries, Ltd. (Hailwood, A. J., and McGlynn, R. P.)
DERIVATIVES OF OXIDIZED OILS OR FATTY ACIDS.

Brit. 326,971 (Sept. 10, 1930); C.A. 27, 1535 (1933).

"Oil, e.g., tung, fish, linseed, derived from fatty acids contg. at least 2 olefinic bonds, or the acids themselves, e.g., clupanodonic and eleostearic, are treated with a regulated proportion of H_2O_2 in the presence of glacial AcOH so as to sat. a fraction of the double linkages by OH groups and to acetylate a fraction of those OH groups. The products may be treated with sulfonating agents with or without previous acylation by an acid anhydride or halide." From C.A.

Imperial Chemical Industries, Ltd. (Morgan, H. H., and Drummond, A. A.)
IMPROVEMENTS IN AND RELATING TO SYNTHETIC RESIN VARNISHES AND SYNTHETIC RESINS.

Brit. 329,313 (filed Nov. 9, 1928); Paint Varnish Production Mgr. p. 34 (Nov. 1930); C.A. 24, 5517 (1930).

Synthetic resin varnishes are prepd. by incorporating phenolic compounds and HCHO with fatty acid esters in the presence of a volatile org. solvent. Synthetic resins may be prepd. from the varnishes by distn. or evapn. of the solvent. Suitable phenolic compds. are phenol and its homologues and mixts. of phenols including coal tar fractions such as cresylic acids and creosote oils. Suitable fatty acid esters are wood oil, linseed, perilla, soya-bean, fish, olive, rapeseed, cottonseed or castor oils. Phenolic compds. and HCHO may be heated for 24-90 hrs. with fatty acid esters in the presence of org. solvents such as cyclohexanol and homologues, benzyl alc., monoalkyl esters of ethylene glycol, ketones, esters or turpentine and preferably with a catalyst such as NaOH or H_3BO_3 in CH_3OH . Alternatively, phenolic compds. and HCHO are boiled for 12-15 hrs. with an excess of an org. solvent such as cyclohexanol or homologues, aliphatic alcs. or ketones, benzyl alc. or turpentine in the presence of an alk. catalyst, after which the product is acidified with a weak acid such as H_3BO_3 and distd. in the presence of a high b. solvent such as benzyl alc. or cyclohexanol until all water is removed. A fatty acid ester is added and distn. continued until a drop of the mixt. heated on a metal plate dries clear and glossy. Driers and colors or pigments may be incorporated in the varnish or resin.

Kronstein, Abraham

IMPROVED PROCESS FOR THICKENING CHINESE WOOD OIL AND MANUFACTURING SUBSTITUTES FOR HARD RESINS THEREFROM.

Brit. 1387 (1901) (Jan. 16, 1902).

Wood oil is thickened and bodies of high consistency obtained when mixtures of wood oil and resins (e.g. dammar, amber, etc.) are heated to 200-250° preferably with exclusion of air.

Kropa, E. L. (to American Cyanamid Co.)

PREPARATION OF ALLYL ESTERS

U. S. 2,249,768 (July 22, 1941); C.A. 35, 6975 (1941); Brit. Chem. Abstracts 1942, B, II, 276.

A description of the preparation of allyl oleostearate, b.p. 171-180° at 1 mm.

Liddell, D. M.

PROCESS OF WATERPROOFING AND WATER-PROOFED MATERIALS.

U. S. 1,524,663 (Feb. 3, 1925); Chem. Zentr. 1925, I, 2721.

"About 2% of Mn "tung-oleate" is mixed with Mg. oxychloride stucco before it is shaped, to waterproof it." From C.A.

Lilienfeld, Leon

PROCESS FOR MAKING PLASTIC MASSES.

Fr. 16,144 (Sept. 13, 1912); Addition to Fr. 417,392; C.A. 7, 1987 (1913).

"In the manuf. of resin- or caoutchouc-like substances, fats or fatty acid or drying oils, especially China wood oil, or fatty acid esters of polyhydric alcs. (lanolin) are treated with amino or hydroxyl derivs. of aromatic hydrocarbons, o. g. heat a mixt. of China wood oil 1 kg., o-toluidine 1 kg., $ZnCl_2$ 60-100 g., to 200-300° until it is consistent. After cooling the mass forms a caoutchouc-like product. These products have a higher m.p. and hardness, as well as elasticity, by treating them with HCHO. HCHO may also be employed with the principal process. The products may be dissolved in benzene or CCl_4 and treated with HCHO. Cf, 6, 3333." From C.A.

Mielek, H., and Heydebrand, F. C. von (to J. Karl, one-third)

WATER AND AIR PROOF COMPOSITION OF MATTER.

U. S. 977,425 (Nov. 29, 1910); C.A. 5, 786 (1911)

"Air and water-proof composition for treating paper, etc. consisting of a liquid mixture of tar 1000, caoutchouc 100, asphaltum 50, pitch 50, ozocerite 50, resin 100, starch 30, dextrin 20, glycerol 4, and China wood or tung oil 6 parts." From C.A.

Seobol, Benjamin

PROCESS FOR THE SOLIDIFICATION OF CHINESE WOOD OIL.

Swiss 92,143 (Application, Sept. 25, 1919); Chem. Zentr. 1922, IV, 268.

Chinese wood oil (from Alourites cordata) is heated with $FeCl_2$, $FeCl_3 \cdot 6H_2O$, $AlCl_3$, or $SnCl_3$ in inert solvents. Elastic masses, resistant to acids and bases, are obtained. Similar to U.S. 1,383,864.

Tiedemann, Carl, and Semming, Rudolf

PROCESS FOR THE COOKING OF WOOD OIL.

Ger. 395,497 (Application Apr. 23, 1922).*

The wood oil, in an unbroken stream, is heated and kept at a temperature that prevents splitting by exothermic processes. The product obtained has good drying speed and weather resistance.

Westinghouse Electric International Co., and Shophord, George R.

ELECTRIC INSULATING COMPOSITIONS.

Brit. 574,356 (Jan. 2, 1946); C.A. 42, 7577 (1948).

"Polymerizable oils, e.g. tung oil and oiticica oil, is put into elec. app., e.g. a lifting electro-magnet, and a predetermined catalyzed polymerization of the oil is then carried out to give a high-grade elec-insulating solid. The polymerization is effected by the use of an anhyd. catalytic soln. consisting of a metal halide catalyst, e.g. FeCl_3 , an anhyd. solvent, e.g. tritolyl phosphate, for dissolving the metal halide, and a deterrent, e.g. castor oil, for modifying the action of the catalyst in order to provide for a controlled rate and time of initiation of the polymerization. The catalyst remains thoroughly dispersed throughout the resulting polymerized solid product, which is a dark homogeneous elastic body having good dielec. properties." From C.A.

